

REPORT
OF THE
MINISTER OF AGRICULTURE
FOR THE
DOMINION OF CANADA
FOR THE YEAR ENDED MARCH 31
1913

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REPORT

OF THE

MINISTER OF AGRICULTURE

1912-13

To Field Marshal, His Royal Highness Prince Arthur William Patrick Albert, Duke of Connaught and of Strathearn, Earl of Sussex (in the Peerage of the United Kingdom), Prince of the United Kingdom of Great Britain and Ireland, Duke of Saxony, Prince of Saxe-Cobourg and Gotha; Knight of the Most Noble Order of the Garter; Knight of the Most Ancient and Most Noble Order of the Thistle; Knight of the Most Illustrious Order of Saint Patrick; One of His Majesty's Most Honourable Privy Council; Great Master of the Most Honourable Order of the Bath; Knight Grand Commander of the Most Exalted Order of the Star of India; Knight Grand Cross of the Most Distinguished Order of Saint Michael and Saint George; Knight Grand Commander of the Most Eminent Order of the Indian Empire; Knight Grand Cross of the Royal Victorian Order; Personal Aide-de-Camp to His Majesty the King; Governor General and Commander-in-Chief of the Dominion of Canada.

MAY IT PLEASE YOUR ROYAL HIGHNESS:

I have the honour to submit to Your Royal Highness a report of the Department of Agriculture for the fiscal year ended March 31, 1913:—

I.—GENERAL REMARKS.

The work of the department has been carried on efficiently, and a synopsis of the operations of the various branches comprised therein is laid before Your Royal Highness under their respective headings.

There has been no legislation affecting the department during this period.

By an Order in Council of date 19th day of April, 1912, under the provisions of Chapter 31, 9-10 Edward VII, intituled 'An Act to prevent the introduction of spreading of insects, pests and diseases destructive to vegetation,' the Regulations established thereunder were amended as follows:—

Whereas in view of the serious prevalence of the Mediterranean Fruit Fly (*Ceratitis capitata*) in the Hawaiian Islands it is advisable and in the public interest that fruit and vegetables from the Hawaiian Islands be prohibited from entering Canada;

Therefore, His Royal Highness the Governor General in Council is pleased to order as follows:—

4 GEORGE V., A. 1914

The Mediterranean Fruit Fly (*Ceratitis capitata*) is hereby scheduled and added to the list of destructive insects and pests as set forth in Section 12 of the Regulations under 'The Destructive Insect and Pest Act' as established by Order in Council, dated 27th February, 1911.

His Royal Highness the Governor General in Council, in virtue of the provisions of clause (a) of section 4, chapter 31, 9-10 Edward VII, is further pleased to order as follows:—

The following section is hereby added to the Regulations under the above named Act, established by Order in Council, dated 27th February, 1911.

Section 16, 'The importation of all non-canned fruits, plants or portions of plants, or other vegetation or vegetable matter from the Hawaiian Islands is prohibited.'

Vide Canada Gazette, Vol. XLV, pp. 3961.

By an Order in Council of date 19th day of April, 1912, under the provisions of Chapter 31, 9-10 Edward VII, intituled, 'An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,' the Regulations established thereunder were further amended as follows:—

Whereas, owing to the consolidation of the Federal and Provincial work of inspecting and fumigating imports of nursery stock, &c., at Vancouver, it is necessary to make certain amendments in the Regulations under 'The Destructive Insect and Pest Act';

Therefore, His Royal Highness the Governor General in Council is pleased to hereby order as follows:

Sections 5 and 9 of the Regulations established by Order in Council, dated 27th February, 1911, are rescinded and the following substituted therefor:—

Section 5. 'All persons importing nursery stock, except such stock as is exempt from fumigation and inspection under Section 3 of these Regulations, shall give notice to the Dominion Entomologist, Central Experimental Farm, Ottawa, within five days of despatching the order for the same. This notice shall include a detailed statement of the nature, quantity and the points of origin and destination of the stock, the name of the consignor and the consignee, and the name of the transportation company or companies carrying the stock. A second notification shall be sent to the Dominion Entomologist by the importer immediately on the arrival of the stock at its final destination. Notice shall also be given by all transportation companies, Custom House brokers, and other persons importing or bringing into Canada nursery stock that is subject to inspection as hereinafter provided, immediately such a consignment is received by them.

This Regulation shall not apply to nursery stock imported into the province of British Columbia by residents in that province.

Section 9. 'Compensation not exceeding two-thirds of the value as assessed by the Inspector, of the vegetation or vegetable matter or containers thereof destroyed by the instructions of an Inspector, shall be granted by the Governor in Council upon the recommendation of the Minister, except in cases where these Regulations are carried out under the direction of the government of a province not granting compensation.'

Vide Canada Gazette, Vol. XLV, pp. 3961.

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By Proclamation under date the 2nd day of May, 1912, under the provisions of Section 3 of the Quarantine Act, Chapter 74, R.S.C., 1906, the Regulations established by Order in Council of date the 12th day of June, 1907, were amended by adding the following words, after sub-clause (c) designating the Quarantine Stations in the province of Nova Scotia:—

‘(d) Digby, including the Annapolis Basin,’ and by expunging the words in sub-clause (c) designating the Quarantine Stations in the province of British Columbia and substituting the following words in lieu thereof:—

‘(c) Prince Rupert and Harbour.’

Vide *Canada Gazette*, Vol. XLV, pp. 4277.

By an Order in Council of date 9th day of May, 1912, under the provisions of Chapter 31, 9-10, Edward VII, intituled ‘An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,’ the Regulations established thereunder were further amended as follows:—

His Royal Highness the Governor General in Council is pleased to order that the Regulations under ‘The Destructive Insect and Pest Act’ shall be and the same are hereby amended as follows:—

Section 9 of said Regulations as amended by Order in Council of 19th April, 1912, is further amended by adding thereto the following words, ‘or in the case of potatoes or potato crops.’

Section 12 of said Regulations is amended by striking out the line thereof reading as follows:—

‘Parasitic diseases affecting potatoes externally or internally’
and substituting therefor ‘Corky Scab’ (*Spongospora subterranea*) (Johns.)

The following sections are hereby added to the said Regulations:—

‘10a.—It shall be illegal to sell, offer for sale, dispose of in any way, receive or use, for seed purposes, any potatoes imported from Europe.’

‘10b.—Every person using for seed other potatoes than such as shall have been raised by himself must obtain, preserve and exhibit on demand, previous to planting, a certificate from the seller or his agent stating that the potatoes to be used for seed have not been imported from Europe.’

Vide *Canada Gazette*, Vol. XLV, pp. 4167.

By an Order in Council dated the 27th July, 1912, Frederick Torrance, B.A., D.V.S., was appointed to the position of Veterinary Director General and Live Stock Commissioner in the Department of Agriculture from the 1st day of August, 1912.

By an Order in Council of date of 19th day of September, 1912, under the provisions of Chapter 31, 9-10 Edward VII, intituled ‘An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,’ the Regulations established thereunder were further amended as follows:—

Whereas it is deemed advisable and in the public interest that the importation of potatoes from Europe should be prohibited:—

Therefore the Governor General is pleased to order and it is hereby ordered as follows:—

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Section 13 of the Regulations established by Order in Council of 27th February, 1911, in accordance with the provisions of Chapter 31, 9-10 Edward VII, intituled 'An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,' is hereby amended by inserting after the word "from" in the first line thereof the word "Europe," so as to read:—

'13. The importation of potatoes into Canada from Europe, Newfoundland or the islands of St. Pierre or Miquelon is prohibited.'

Sections 10a and 10b of the Regulations established under Order in Council of 9th May, 1912, are hereby repealed.

Vide *Canada Gazette*, Vol. XLVI, pp. 977.

By an Order in Council under date 16th day of November, 1912, under the provisions of Chapter 31, 9-10 Edward VII, intituled 'An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,' the regulations established thereunder were further amended as follows:—

His Royal Highness the Governor General in Council is pleased to order as follows:—

Section 12 of the Regulations established under 'The Destructive Insect and Pest Act' is hereby amended by striking out the following words:—

'Corky Scab' (*Spongospora subterranea*) (Johns), 2.

Vide *Canada Gazette*, Vol. XLVI, pp 1742.

By an Order in Council approved by his Royal Highness on the 21st November, 1912, the resignation of Frederick Torrance, B.A., D.V.S., as Live Stock Commissioner in the Department of Agriculture was accepted to take effect from the 30th November, 1912.

By an Order in Council approved by His Royal Highness, under date 21st November, 1912, Mr. John Bright, of Myrtle, Ont., was appointed to the position of Live Stock Commissioner in the Department of Agriculture, from the 1st of December, 1912.

By an Order in Council under date 10th day of December, 1912, under the provisions of Chapter 75, R.S.C., 1906, intituled 'An Act respecting Infectious or Contagious Diseases affecting Animals,' the Regulations established thereunder were further amended as follows:—

Whereas the government of the province of British Columbia is carrying on an active campaign against Bovine Tuberculosis:

And whereas the government of the said province has requested the federal government to take action to prevent the entrance into that province from other parts of the Dominion, of cattle unless they have passed the tuberculin test:

And whereas it does not appear desirable to comply with the request in full, but the Minister of Agriculture is of the opinion that it would be desirable to restrict all pure bred cattle from entering that province if not accompanied by a satisfactory tuberculin test certificate:

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Therefore His Royal Highness the Governor General in Council is pleased, in virtue of the provisions of Section 28 of The Animal Contagious Diseases Act, and with a view to assisting the province of British Columbia in its endeavours to stamp out Bovine Tuberculosis in that province, to Order that the Quarantine Regulations approved by Order in Council of the 30th November, 1909, and amended by Order in Council of the 19th August, 1911, shall be and the same are hereby further amended by inserting the following section after section 82 of the above mentioned Regulations:—

‘82½. No common carrier shall receive for shipment or carry into the province of British Columbia, any registered pure bred cattle, unless the same are accompanied by a certificate signed by an inspector setting forth that within thirty days prior to the date of shipment they have been submitted to and have passed the tuberculin test.’

By an Order in Council under date of 10th December, 1912, under the provisions of Chapter 31, 9-10, Edward VII, intituled ‘An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,’ the regulations established thereunder were further amended as follows:—

Whereas it is deemed advisable and in the public interest that immediate steps should be taken to protect Canada from the spread of Gipsy Moth at present prevalent in certain parts of the United States,—

Therefore the Governor General in Council, in pursuance of the provisions of Chapter 31, 9-10 Edward VII, intituled ‘An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,’ is pleased to order and it is hereby ordered as follows:—

The following Regulation is hereby added to the Regulations under the Destructive Insect and Pest Act established by Order in Council of 27th February, 1911:—

‘No. 17. Forest plant products including logs, tan bark, posts, poles, railroad ties, cordwood and lumber originating in any one of the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island, six of the United States of America, shall not be admitted into Canada unless such forest plant products shall be accompanied by a certificate showing that they have been inspected by the United States Department of Agriculture and found free from the Gipsy Moth. Each Shipment shall be accompanied by such an inspection certificate and the certificate shall accompany the bill of lading, way bills or other memoranda pertaining to such shipments.

The importation of coniferous trees such as spruce, fir, hemlock, pine, juniper (cedar) and ‘arbor vitæ’ (white cedar) or foliage thereof, and decorative plants such as holly and laurel known and described as ‘Christmas greens or greenery’, from the States of Vermont, Maine, Massachusetts, New Hampshire, Connecticut and Rhode Island is prohibited.’

Vide *Canada Gazette*, Vol. XLVI, pp. 2080.

By an Order in Council under date 4th day of January, 1913, under provision of Chapter 75 R.S.C. 1906, intituled ‘An Act respecting Infectious or Contagious Diseases affecting Animals,’ the Regulations established thereunder were further amended as follows:—

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Whereas it is deemed advisable and in the public interest that the importation, manufacture, or sale of Hog Cholera serum and virus be prohibited in the Dominion of Canada,—

Therefore His Royal Highness the Governor General in Council, in virtue of the provisions of clause (I) of section 28 of chapter 75 Revised Statutes of Canada, 1906, is pleased to order as follows:—

The Quarantine Regulations established by Order in Council of the 30th November, 1909, as amended by Order in Council of the 19th August, 1911, are hereby further amended by adding the following section thereto:—

88½. The use of Hog Cholera serum or virus, being considered a source of danger, the importation, manufacture, sale or use of such serum or virus, is prohibited.

Vide *Canada Gazette*, Vol. XLVI, pp. 2466.

By an Order in Council under date of 25th day of February, 1913, under the provisions of Chapter 31, 9-10 Edward VII, intituled, 'An Act to prevent the introduction or spreading of insects, pests and diseases destructive to vegetation,' the Regulations established thereunder were further amended as follows:—

Whereas, in order to protect Canada from the spread of the Gypsy Moth prevalent in certain parts of the United States of America, the Regulations under the Destructive Insect and Pest Act, established by Order in Council, dated 27th February, 1911, were amended, by Order in Council, dated 10th December, 1912, by adding thereto a regulation numbered '17.'

And whereas the Dominion Entomologist has reported that he is of the opinion that until the Gypsy Moth actually reaches and is found to occur in the State of Vermont, it is unnecessary that that State should be scheduled,—

Therefore the Governor General is pleased to order as follows:—

Regulation No. 17 under the Destructive Insect and Pest Act, established by Order in Council, dated 10th December, 1912, is hereby amended by expunging the word 'Vermont' therefrom.

Vide *Canada Gazette*, Vol. XLVI, pp. 3147.

As intimated in my Report of last year the Festival of Empire and Imperial Exhibition held at the Crystal Palace, London, England, closed on the 31st of October, 1911. However, before dismantling the Canadian Building, Canada was asked whether the Government would like for the year 1912 to maintain their building in the Crystal Palace grounds. This was thought advisable, and the Canadian Exhibit was continued until the end of October, 1912, when the staff was required in connection with the preparation of Canada's Exhibit at the International Exhibition to be held in Ghent, Belgium, in 1913.

It having been decided that Canada would accept the invitation of the Belgian Government to be represented at the International Exhibition to be held in Ghent, Belgium, in 1913, Mr. William Hutchison, the Permanent Canadian Exhibition Commissioner has been busily engaged with his staff in making the necessary preparations for Canada's participation at the above named Exhibition, which is to open on the 26th April, 1913.

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A Report from the Canadian Exhibition Commissioner for the fiscal year ended 31st March, 1913, will be found as an appendix hereto. (See Appendix No. 18.)

The Seventh International Congress against Tuberculosis was held in Rome, Italy, commencing on the 14th April last. Canada was represented thereat by Dr. Severin Lachapelle, of Montreal, P.Q.; Doctor D. A. Stewart, of Ninette, Manitoba; Doctor A. Rousseau, of Quebec, P.Q.; Doctor Arthur J. Richer, of St. Agathe, P.Q.; and Professor J. J. MacKenzie, of Toronto University, Toronto, Ont.

A report thereon has been received and is appended hereto. (See Appendix No. 19.)

II. ARTS AND AGRICULTURE.

DAIRY AND COLD STORAGE BRANCH.

The Divisions of Dairying, Fruit, Extension of Markets and Cold Storage are grouped together and form the Dairy and Cold Storage Branch, of which the Dairy and Cold Storage Commissioner is the Chief Officer.

Appreciating the importance of the different lines of agricultural production which the work of the Dairy and Cold Storage Branch touches, I have deemed it advisable to arrange for a substantial increase in the appropriations for this branch. An increase was made in 1912-13, and a further increase is asked for in the estimates for 1913-14.

With more funds available the work of the Branch has naturally expanded, and will continue to do so. New lines of work have been taken up, and a large number of new employees have been added to the outside staff during the past year.

THE DAIRYING SEASON OF 1912.

The prevailing weather during the summer of 1912, with a rainfall above normal and with many cloudy days, was in marked contrast to that of 1911. Weather conditions affect the production of milk, and on the whole the season of 1912 was very favourable.

The ruling prices for both butter and cheese were higher than during the previous year. This is especially true with regard to butter.

THE EXPORT TRADE.

There was a decrease in both quantities and values of dairy produce exported during the year. Full particulars will be found in the Report of the Dairy and Cold Storage Commissioner.

The most notable feature of the export trade for the year is found in the fact that for the first time in over 60 years Canada has shipped no butter to the United Kingdom. The total exports amounted to approximately half a million pounds, which consisted chiefly of tinned butter to the West Indies and dairy butter to the United States.

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There has been a much smaller export of cream to the United States than during the previous year, on account of the high price of butter in Canada.

IMPORTS OF BUTTER.

Comparatively small quantities of butter have been imported into Canada during periods of temporary scarcity for many years. During recent years supplies of New Zealand butter have been imported at Vancouver, direct from New Zealand, in increasing quantities. Small quantities have also reached Canada via London and Montreal.

The past year has, however, seen an enormous increase in these shipments, and during the twelve months ended November 30th last, the imports reached a total of 6,694,722 pounds, mostly from New Zealand.

THE HOME TRADE.

The decline in our export trade and the increase in the imports of butter does not indicate any decline in the dairying industry. The fact is evident when the various sources of information are considered that the production of milk in Canada is larger at the present time than it ever was in the history of the country; and that there has been a constant increase in production since the exports began to decline, the difference being accounted for by the increased home consumption. There is a large per capita increase in the consumption of milk, cream and ice cream in addition to the increase due to greater population.

THE NEW DAIRY STATIONS.

The new dairy stations which were mentioned in my last report were completed during the past summer and are now in full operation. The station at Finch consists of a combined creamery and cheese factory with facilities for carrying on experimental work. It will be operated as a cheese factory during the summer months and as a creamery for the balance of the year. Competent investigators are to be employed who will carry on experiments relating to the manufacture of butter and cheese and the handling of milk and cream.

The Brome Dairy Station will be operated as a creamery the year around with two tributary skimming stations. Both the Finch and Brome stations have been fitted with up-to-date apparatus and machinery to provide the necessary facilities for conducting experiments as well as for the manufacture of butter and cheese in the most approved manner.

It is expected that the revenue to be derived from the manufacture of butter and cheese at these stations will pay all the expenses of operation except that which is incurred on experimental account.

The erection of these two stations must not be taken to mean the inauguration of a policy to operate cheese factories and creameries generally. The plans and specifications of both establishments are available to those who apply for them, and the results of the experiments conducted will be published for general distribution. Cheese factory and creamery owners and the patrons thereof in all parts of the country will receive as much benefit as those in the immediate vicinity.

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COW TESTING.

This work which has for its object the improvement of the dairy herds of Canada has been continued and extended during the past year. Eight new Dairy Record Centres were established, making 14 in operation. This number will be added to during the coming year. The Department through the Dairy and Cold Storage Commissioner continues to furnish to all farmers who apply for them, free of charge, the blank forms which are used in keeping records of individual cows. I am informed that the demand for these record forms has increased enormously during the past year. This is a very important result of the propaganda which has been carried on for some years past. Hundreds of farmers throughout the country are making tests of their cows on their own account.

EXTENSION OF MARKETS DIVISION

ICED CAR SERVICES

The special refrigerator car services for the carriage of butter in small quantities and for the carriage of cheese and fruit in carloads was arranged for with the railway companies as in former years. This relates more particularly to the produce intended for export. The inspection of refrigerator car services which is assigned to the Extension of Markets Division was carried out as usual.

CARGO INSPECTION.

The cargo inspection service which has been fully explained in previous reports was extended during the past season by sending an inspector to Portland, Maine, after the close of navigation at the port of Montreal; two inspectors were employed at Halifax, one at Quebec and five at Montreal during the season of navigation.

THERMOGRAPH RECORDS.

The thermograph records from the chambers and holds of steamers carrying produce which are obtained through the agency of the cargo inspectors at Canadian and British ports continue to be a useful record in the transportation of perishable products. Copies of these temperature records are given to the agents of the shipping companies, a copy of each record is posted in the Exchange Room at the Board of Trade, Montreal, another copy is given to the engineer on the ship and copies are sent to any shipper who is interested in the cargo which the record relates to.

This Division also makes a study of prices for farm products and keeps a record of the principal Canadian and United States markets for easy reference.

THE FRUIT DIVISION.

The season of 1912 was notable for the extremely heavy crop of apples in British Columbia and the Pacific Coast States, which resulted in a keen competition in the markets of the prairie provinces, and emphasized the necessity for a thorough organization on the part of Canadian growers for the purpose of controlling the selling end of their business.

FRUIT INSPECTION.

The administration of Part IX. of the Inspection and Sale Act, commonly known as the Fruit Marks Act, is assigned to and is an important part of the work of the Fruit Division.

The fruit inspection service was thoroughly reorganized and considerably extended during the past season. Five inspectorates were established as follows:—

District No. 1—Maritime Provinces.

“ “ 2—Province of Quebec and Eastern Ontario.

“ “ 3—Western Ontario.

“ “ 4—Prairie Provinces.

“ “ 5—Province of British Columbia.

The office of Chief Inspector was created and a Chief Inspector was assigned to each of the districts named.

For the season of 1912, 48 inspectors were employed, including 5 chief inspectors. The largest number employed in any previous year was 30.

While there has been improvement in the packing of fruit, especially with regard to apples, the inspectors have found it necessary to lay complaints in a number of cases, and 90 persons have been convicted during the year for violations of the Inspection and Sale Act. Of this number 10 cases related to imported fruit which was not marked according to the requirements of the Act.

THE FRUIT CROP REPORT.

A monthly Fruit Crop Report was published, as in former years, from May to September, making five issues for the season.

FRUIT PACKING.

The services of permanent fruit inspectors have for some years been utilized during the slack periods, as far as their skill and experience would permit, to give instruction in the packing of apples. To meet the increasing demand for instruction in the packing of apples in boxes, I have authorized the appointment of an expert who will give his whole time to that work.

APPLES FOR INTERNATIONAL EXHIBITIONS.

The Dairy and Cold Storage Commissioner has for some years been intrusted with the matter of securing apples for display at the various International Exhibitions in which Canada has been taking part. Over 1,500 boxes of apples, collected from all the fruit growing provinces, were recently shipped to the Exhibition Commissioner at London for use at Ghent, Belgium, during the coming summer.

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COLD STORAGE.

CREAMERY COLD STORAGE BONUSES.

The policy of paying a bonus of \$100 to creameries for the erection of approved refrigerators has been continued.

COLD STORAGE SUBSIDIES.

Six contracts were entered into during the year for the payment of subsidies on public cold storage warehouses erected according to the terms of the Cold Storage Act. Other applications are now under consideration.

PUBLICATIONS.

An Annual Report giving the details of the work of the Branch is being prepared by the Dairy and Cold Storage Commissioner, and it will be published as an appendix to this volume. A number of bulletins dealing with particular subjects relating to dairying, fruit growing, and cold storage have been published during the year. Blue print plans for cheese factories, creameries, small cold storages and farm dairies are sent free of charge to any person who applies for them.

MEETINGS.

A large number of meetings have been attended by the officers and experts attached to the Dairy and Cold Storage Branch.

SEED COMMISSIONER'S BRANCH.

The service of the Seed Branch has continued to expand in each of three main divisions: (a) Seed Growing, (b) Seed Testing, (c) Seed Inspection. The work of encouraging the production of selected seeds by farmers was started in a small way in 1900; a seed laboratory for the testing of seeds was established in 1902; and the Seed Control Act requiring the inspection of seeds when exposed for sale in commerce became law in 1905. There are now sixty-two officers, clerks and temporary seed inspectors engaged in this service for agriculture.

Seed Growing.—New and improved varieties and strains of seeds are commonly made available to farmers and gardeners by plant breeding experts employed at both federal and provincial experiment stations. There are a few seed growers in each province who follow an approved system of selection to maintain the purity of such seed while increasing the quantity from year to year. Their crops and seeds are regularly inspected and if of superior quality are recommended by my district seed inspectors for registration in the records of the Canadian Seed Grower's Association. The selected seeds produced by growers who make a speciality of that work are much in demand by farmers who compete for prizes in field crop competitions with seed grain and other field and garden crops. The plan for co-operating with the provinces

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that I authorized last year with a view to extend the benefits that accrue from these field competitions has been productive of gratifying results. These seed growing competitions among farmers have materially increased in all of the provinces, and in addition to creating large supplies of excellent seed grain and other seeds in almost every farming district and even locality, the special care as to cultural methods in producing prize winning crops serves as an excellent object lesson and tends to stimulate much interest among farmers in general in the agricultural practices of their more successful neighbours. .

Seed fairs and provincial seed exhibitions are both educational and commercial in scope and character. The seed fairs are quite local and held at an opportune time of year for the sale and exchange of seeds among farmers. The best exhibits shown at seed fairs, the seed from prize winning fields in the field crop competitions and registered seeds of selected stocks are brought together for exhibition and sale at the larger provincial seed exhibitions. To meet the cost of maintaining them subventions are provided to all the provinces to the extent of two-thirds of the prizes awarded. It is a pleasure to report that the usefulness of these organizations has been materially extended during the past year.

Field root and garden vegetable crop seeds have not heretofore been commonly grown in Canada in quantity for commerce. Some experimental work that has been done would seem to indicate that better results are to be obtained from these crops when selected acclimated seeds are used. The high cost for farm labour in Canada compared with the abundance and cheapness of labour skilled in seed growing in those countries from which these seeds are imported has tended to discourage the home production of selected seeds for these crops.

With a view very gradually to create a supply of acclimated seeds of field root and vegetable crops, I authorized the payment of subventions to *bona fide* growers of properly selected seeds of certain staple kinds, subject to definite regulations and efficient inspection on the part of my district officers. The main purpose of extending this form of encouragement to competent seed growers is educational. The subvention offered amounts to approximately one-eighth of the average retail price for the kind and, it is estimated, will be about sufficient to neutralize the advantage of cheap labour that is available to the seed growers of Europe.

During the growing season my district officers were able to devote several weeks to inspecting seed crops in the principal grass and clover seed producing districts. Encouragement has also been given to the growing of clover seeds in many districts where these seeds have commonly been imported though seldom if ever saved from the crop. Much good work has been done by visiting the growers of these seeds on their farms and giving them expert advice as to the best methods of weed eradication and the production of seed of the highest grade for commerce.

An exhaustive treatise on fodder and pasture plants and the production of seed from them, with coloured illustrations of all the principal kinds of grasses and clovers, has been prepared and as soon as printed will be distributed free to public institutions including the libraries of farmers organizations, and made available to individuals at a very nominal price.

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Seed Testing.—The testing and grading of seeds under the Seed Control Act has continued to increase. Grass and clover seeds for purity test and official grading made up sixty-eight per cent of the total work at the Ottawa, and only about nine per cent at the Calgary seed laboratory. Seventy per cent of the samples received at the Calgary laboratory were of cereal grains for germination test. In all, 11,215 samples were received, tested, and reported upon from the Ottawa laboratory during the past year which shows an increase of thirteen per cent over the previous year. A total of 7,832 samples were tested and reported upon from the Calgary laboratory. Because of more favourable climatic conditions for maturing the cereal crop of 1912, there was very little damage to the oats and other grains from frost and, in consequence, the necessity on the part of farmers of having their seed grain tested as to vitality was less pronounced than in some former years. The need for careful attention on the part of my officers to prevent the unwitting use for seed of oats that may have suffered from low temperatures before being fully matured and dried is indicated in the conditions of the past year which was considered reasonably favourable in respect to climate, but when out of 3,678 samples of seed oats tested 817 samples germinated less than 63 per cent.

The change in the Seed Control Act which requires seed merchants to grade their timothy and clover seeds according to definite standards of quality before exposing them for sale, has entailed a large increase in the service of testing and grading samples for seed merchants. Formerly about one-half of the work done in the Ottawa seed laboratory was for farmers; during the past year 8,208 samples were tested for seed merchants, and 3,007 for farmers at Ottawa; and 2,092 for seed merchants, and 5,645 for farmers at the Calgary laboratory.

The testing for purity and grading of grass and clover seeds for commerce must be done with reasonable promptness. A certificate of grading has been issued on all samples sent in for that purpose during the past season, within twelve working hours of the time when the samples were received at the laboratories. To ensure prompt service with this work it is necessary to maintain a well trained staff of seed analysts sufficiently large to meet the demands for that service at the busiest season of the seed trade.

The following table shows the percentage of the total number of samples for the year that was received for test during each month for the past three years:—

Month	1910-11.	1911-12.	1912-13.
April	15.11	15.26	17.85
May	9.91	8.44	7.14
June	0.83	0.64	0.65
July	0.78	0.72	0.66
August	2.36	1.82	1.33
September	2.93	2.29	2.43
October	8.72	6.10	4.49
November	3.69	4.91	6.73
December	8.19	11.63	6.33
January	13.14	14.49	13.24
February	14.31	20.01	15.35
March	24.77	25.16	25.84

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During the winter and early spring months practically all of the permanent laboratory staff are employed in technical work and the staff is increased by the addition of temporary clerks for clerical and other work. In the summer months the permanent staff are fully employed in investigating conditions of the commerce of seeds by testing samples collected for that purpose by seed inspectors, and in other divisions of the work of this Branch.

It is believed that as a result of an efficient service for seed testing having been made available to farmers and seedsmen much greater care is taken by them in the matter of the purity as to weed seeds and the vitality of seeds. It is not possible completely to prevent the introduction and dissemination of weed seeds in commercial seeds but there is good reason to believe that the educative effects of seed testing and other work supplemented by legislation has tended towards the elimination of useless waste and the production of better crops through discouraging the production and sale of impure seeds and encouraging the selection and commerce of the best.

The trial plot tests with field root seeds were continued during the past year. The purpose of this branch of seed testing work is to investigate the extent to which mixed and inferior stocks of these seeds are imported and distributed in the retail trade. To do this work specially skilled experts are required and a sufficient area of land for growing the seeds to be tested to the full maturity of the plants. During the past year I was able to arrange for a few acres of land to be donated to that purpose at the Experimental Farm.

Seed Inspection.—The work of seed inspection is instituted to secure the observance of the Seed Control Act. For the convenient and more efficient administration of this service the whole territory to be covered is divided into seven principal districts and each district is placed under the direct charge of a competent and experienced seed inspector. During the busy season of the seed trade temporary inspectors are employed to assist with the work in each district. It is their duty to inspect the seed and, if it is found to be contaminated with noxious weed seeds, wrongly graded, nonvital or otherwise exposed for sale contrary to the provisions of the Act, an official sample is drawn in the presence of the seller and sent to the laboratory for comparison with the original sample that was graded, or for vitality or purity test.

It is gratifying to be able to report that everywhere in Canada the administration of this law and the regulations thereunder has met with the wholesome support of both farmers and seed merchants. I regret that there were a few merchants who were recommended for prosecution and who received the condemnation of the court because of repeated careless practices on their part.

I have been pleased again this past year to co-operate with my colleague the Honourable the Minister of Interior by having my staff of seed inspectors assist in the work of procuring a supply of clean seed grain required for distribution to needy homesteaders in the prairie provinces; also to assist in procuring a supply of good seed oats that were purchased by the farmers of North Eastern Quebec.

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LIVE STOCK BRANCH.

An important change has been made in the administration of this Branch during the past year. Following the resignation of Dr. J. G. Rutherford, as Live Stock Commissioner, in March 1912, it became impressed upon me that the separation of the Health of Animals and Live Stock Branches would be in the best interests of the Public Service. This proposed change was definitely provided for in November, 1912, and became operative in the following December, with the appointment of Mr. John Bright of Myrtle, Ontario, as Live Stock Commissioner. Should any justification for this step be sought for, it ought not to be difficult to find it in the constantly growing demand upon our live stock resources by the expansive development of commercial and industrial activities in the country and in the fact that live stock production is passing through a somewhat critical stage in its history and is now admittedly unable to keep pace with the increasing consumptive demand of the home markets for meat and meat products. I do not hesitate to say that very great opportunities are offered at the present time for the initiation of a constructive campaign in the interests of our live stock industry and no apology is offered that improved facilities are being provided for its effective administration.

During the year, something really tangible has been done to encourage the sheep industry. A very liberal grant was made through the Live Stock Branch to the Dominion Sheep Breeders' Association and this was spent in purchasing and in distributing, through the medium of auction sales, a large number of pure bred rams and grade ewes in British Columbia and in the maritime provinces.

The work, on behalf of the Dominion Sheep Breeders' Association, was carried on through a committee of three of its members, one of whom purchased the sheep, while the two others prosecuted a campaign of investigation and education, one of them working in British Columbia and the other in the maritime provinces. Each of the latter delegates was accompanied by an officer of the Live Stock Branch, while a local member was added to the committee in the maritime provinces.

The British Columbia committee reported that a keen interest was evidenced not only by the new settlers who were anxious to secure a few individuals to start a flock, but, as well, by the larger farmers and land owners. The quality of mutton and lamb supplied at the present time by the home breeders represents but a very small part of the total amount consumed in the province. Australasia supplies annually more than 100,000 frozen carcasses, while thousands of live sheep and lambs are brought in from United States. The keen local demand, coupled with the fact that sheep have proven a profitable investment under the varying conditions which are found on the islands, on the lower main and in the upper country, has turned the attention of many people to the prospective advantages likely to be realized through maintaining sheep on their farms. A little direction and assistance at this time should result in making sheep raising one of British Columbia's most profitable industries.

The Maritime Committee made a thorough investigation as regards the methods followed by the sheep men and the farmers in the eastern provinces. Through per-

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sonal contact with the breeders upon their own farms, the committee were enabled to get an insight into conditions and also to offer much practicable advice in encouraging the adoption of improved methods in the care and management of sheep. In the majority of sections, the need of better sires with which to grade up the flocks was very apparent. Evidence of the lack of proper feed, of faulty care and of bad management was repeatedly observed. Co-operation, except in one or two districts in Prince Edward Island, had not been practised. The steady decline of the industry during several decades may be attributed to the fact that a practical knowledge of sheep raising is possessed by only a few farmers and breeders in these provinces.

Notwithstanding this, few countries are favoured with greater natural advantages in their adaptability to sheep raising, particularly when there are considered the factors of cheap land, of a suitable climate, a steadily growing home market and of water transportation to the important markets of United States and Great Britain. Maritime lamb has already achieved a reputation on the American market and there commands a premium because of its quality. The shortage of the local meat supply and the consequent rise in price is doing much, however, to revive an interest in sheep keeping and to create a desire to follow improved methods in breeding and marketing.

In British Columbia there were distributed 130 pure bred rams and upwards of 1,000 grade ewes. In the maritime provinces the total number offered at the sales consisted of 400 pure bred rams and about half that number of ewes. It is believed that, as a result of the introduction of this new blood, there will be a consistent improvement in the quality of the stock raised, and, at the same time, it is expected that considerably more sheep will be reared than has been the case during the past years.

To provide for the prosecution of an aggressive and systematic campaign in the interests of the sheep industry, I authorized, in the early part of the year, the appointment of a Sheep Specialist, whose duty it would be to give direct assistance to sheep raisers and to devise means for ameliorating the conditions under which sheep are raised and their products marketed. During the summer, this officer confined his field of endeavour to the western provinces. There in the past, the preparation and marketing of wool has been pursued in a rather haphazard fashion, as a result of which the grower has not received a price that the inherent quality of his product would warrant. The Sheep Specialist has been able to assist in the organization of two flourishing wool growers' associations, the success of which is directly proving the advantages that invariably result from concerted action.

The gathering of specific information relative to the marketing facilities for this commodity has received attention. Not only have conditions in the home market been carefully studied, but, as well, those in Great Britain. Information from the latter source is exceptionally valuable, particularly as Great Britain represents the central market for the world's wool, and on this market virtually all prices are controlled and fixed. An effort is being made to bring about such a standardization of Canadian wool and to improve the methods followed in its preparation that it may

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compete successfully in the world's markets with the wool produced in countries where a more perfect organization prevails. It has become clear that, in order to promote an extension of sheep raising in Canada, the whole problem relating to the production and marketing of wool must receive primary attention.

During the past year lecturers have been supplied, upon request, to various provincial departments, winter fairs, boards and local organizations. This form of assistance has been taken advantage of very freely, and from reports received, the services of the speakers supplied have proved most acceptable. In addition, the usual series of agricultural meetings were arranged for during February and March in the French speaking districts of the province of Quebec. Forty-eight places in all were included in these series, and, as a result of special efforts made to insure proper advertising of the meetings, the average attendance was much higher than heretofore. The interest manifested in the subjects discussed by the speakers on the various delegations was highly encouraging and the opportunity thus afforded of interchanging ideas with men of more than local agricultural experience was evidently much appreciated.

The policy of supplying judges of live stock and of poultry for exhibitions, winter fairs and local fall fairs to associations applying for same has been continued by the Department. The advantages resulting from the employment for work of this kind, of specially qualified men who have no special interest in the awards, have become widely recognized by exhibitors and the many requests received for assistance of this nature have amply justified its continuance.

The Canadian Record of Performance work, now firmly established in the confidence of the farming public, has continued to expand. With the exception of the province of Manitoba, from which up to the present time no entries have been received, each province in the Dominion is well represented in the tests. While the number of entries from Ontario and Quebec still greatly exceed those from other provinces, there has been a very noticeable growth in the work, both in the east and the west. A year ago the appointment of an inspector for the maritime provinces was noted. During the past year the rapid development of the work in the province of British Columbia has necessitated the appointment of a special inspector for that province. In Ontario and Quebec, eight inspectors are now devoting all of their time to supervising tests, two additional men having been appointed in order to keep pace with the work. In all, upwards of one hundred and fifty herds are now represented in the tests with a total of nearly one thousand cows entered. While the work is of very great and direct benefit to the pure bred stockmen, it has a wider influence in furnishing to the owners of grade herds reliable and valuable information to govern the selection of bulls to place at the head of their herds. The justification of the undertaking of the work in the first place lay in a large measure in this fact and already there has been ample demonstration of appreciation on the part of dairy men in general of the advantage thus afforded. The ultimate improvement in the dairy stock of the country, which will be attained as a result of this form of assistance, cannot, therefore, even be estimated.

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The officers engaged in furthering the poultry work of the Branch have been largely concerned with problems of marketing poultry produce, particularly that phase relating to the unsatisfactory conditions apparent in the Canadian egg trade. It has been evident for some time that the enormous losses occurring in this trade and the general unsatisfactory condition of eggs as they reach the consumer are due, to a certain extent, to carelessness and neglect on the part of the farmer and to the practice by many merchants and local egg buyers of holding eggs at certain seasons of the year without having proper facilities for storing them.

Two plans of work have been followed. Based on the conditions already mentioned, the first includes the assistance extended in the organization of Co-operative Egg Circles and of other means tending to facilitate the marketing of eggs more frequently and regularly. A number of these circles in Ontario, Quebec and the maritime provinces are now actively engaged in shipping their eggs co-operatively. Mr. T. A. Benson, who was appointed to have charge of the poultry work of the Live Stock Branch in Prince Edward Island, has been largely responsible for the furthering of this plan in that province. Owing to the frequent number of requests received, other officers of the Branch are now actively engaged in this work in other provinces.

The second phase of the poultry policy has entailed a thorough investigation of the wholesale egg trade. Already considerable information has been acquired, and it is expected that, when the material is all in hand, there will be available sufficient information on which to base a comprehensive policy of education and legislation. Mr. J. H. Hare, B.S.A., formerly representative of the Provincial Department of Agriculture in Ontario county, has recently been appointed to take charge of this work.

A number of leaflets and bulletins dealing with the various phases of the work have been from time to time prepared. Of these, special mention may be made of Bulletin No. 16, the demand for which has been so great that within five months from date of publication, the first edition of 30,000 copies was exhausted. A second edition is now being printed.

Several provincial and federal organizations have been granted direct financial assistance to enable them more successfully to carry on their work. The office of the National Live Stock Records has received the largest individual grant, it being conceded that the work entailed in the registration of our pure bred live stock under the system in vogue in Canada deserves generous recognition and support. Of the other bodies receiving aid of this nature, there may be mentioned The Poultry Producers' Association of Canada, several Provincial Cattle Sales, The Maritime Winter Fair and the Winter Fairs of Manitoba, Saskatchewan and Alberta.

DOMINION EXPERIMENTAL FARMS AND STATIONS.

To the fourteen branch farms and stations reported on last year has been added an experimental station for the province of New Brunswick, located at Fredericton.

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Much has been accomplished during the year in the better fitting of those branch farms already established, for the various lines of work to be taken up. Further areas have been added to some of them, allowing scope for a wider range of experiment and a number of new buildings have been erected.

These features are reported on in more detail in the notes on the different farms and stations given below.

The increasing volume of work and the elaboration of the experiments being carried on, made necessary a rearrangement of the Divisions at the Central Farm. The former Agriculturist's Division has been made into two, the Division of Animal Husbandry and that of Field Husbandry. A Division of Forage Plants has also been established, having to do with the study of varieties of corn, roots, clovers and grasses.

Since April 1, 1912, the following publications have been issued:

Of the Second Series of Bulletins, No. 10, the Large Larch Saw-fly; No. 11, Legislation in Canada to prevent the Introduction and Spread of Insects, Pests and Diseases injurious to Vegetation; No. 12, Feeding for Beef in Alberta; No. 13, Experiments in Steer Feeding in Manitoba and No. 14 on Corn-growing in Manitoba.

Of pamphlets, there were issued No. 9, on Hardy Rose Culture in Canada; No. 10, on Tomato Culture and No. 11, on Cabbage and Cauliflower Culture.

The circulars brought out were No. 1, on Potato Canker; No. 2, The Orange Hawk-weed; No. 3, Potato Canker and also Entomological Circulars No. 1, on Tent Caterpillars and No. 2 on Flea Beetles and their Control.

In addition to the above, a Guide to the Experimental Farms and Stations was prepared. This publication gives a short account of the work being done in each division at the Central Farm as well as outlines the work under way at each branch farm and station. It is generously illustrated with maps and plates.

FIELD HUSBANDRY DIVISION.

Field crop experimentation, which in the past has formed a part of the work of a larger division having to do with both the culture of field crops and the raising of live stock, now constitutes a division in itself.

The scope of its work includes soil cultivation and drainage, methods and costs of growing, harvesting, and storing farm crops for grain and fodder, the conduct and comparative values of different rotations for live stock purposes.

In soil cultivation it is aimed to learn the minimum cost and the most effective methods of increasing crop yields and preserving soil fertility.

In the growing of crops, studies are made of the comparative values of different kinds as forage for live stock.

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During the past year the rotation tests have been reorganized and extended so that there are now laid down fifteen permanent rotations. In the investigation of these the following points of merit are being considered:—

1. Their ability to supply different crops in the proportions for certain needs.
2. Their power to keep weeds in check.
3. Their effect on the fertility of the soil, as may be evidenced by an increase in crop production from one series of years to another.
4. Their comparative profits.

ANIMAL HUSBANDRY DIVISION.

This is a new division of the Experimental Farm system, made separate from that of Field Husbandry during the past year.

The work of this division is to directly lay out and superintend the feeding, management and housing of animals; the manufacturing and marketing of products from same and all routine and experimental work connected therewith on the Central Experimental Farm.

By visiting the branch farms, the Animal Husbandman has been brought into close touch with their work. Such should tend to assist the superintendents under the supervision of the Director, to lay out new live stock experimental work and in better systematizing that work which has been in progress.

LIVE STOCK ON CENTRAL FARM.

Horses in the past have been used for working purposes only, but during the past year breeding work was commenced. A few mares are now in foal; the number will be increased as accommodation permits.

Beef cattle work for the past year was limited to experimental steer feeding, no breeding stock being kept.

Dairy cattle are receiving increased attention. Representatives of five breeds, namely: Holstein, Ayrshire, Guernsey, Jersey and French Canadian are kept, all of which have shown remarkably good returns. Many pure bred animals from these herds are annually sold for moderate prices. The increasing demand for such stock indicates the desire of farmers to improve their breeding herds.

Sheep are kept in small numbers. Shropshires and Leicesters, representing respectively the medium and long wool types of sheep, make up the flock.

Swine raising has again demonstrated itself as one of the best paying branches of the live stock work. Yorkshires, Tamworths and Berkshires are kept, with which valuable and interesting breeding and feeding experiments are conducted. Large numbers of young pure bred animals for breeding purposes are annually sold at a moderate price. The increasing demand for such is an encouraging evidence of the awakening of the live stock industry.

Much experimental work has been conducted as to the most advantageous methods of producing and marketing farm produce, particularly that from the dairy herds.

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Such work has included the manufacturing of butter, Cheddar cheese, cream cheese, Coulommier cheese, pure milk and certified milk; also testing of efficiency and economy of milking machines and many co-relative problems. Much information of economic value is thus being secured.

BUILDING FOR ANIMAL HUSBANDRY DIVISION.

An excellent barn wherein to conduct dairy feeding and live stock digestion experiments has been erected during the past year. The new building in most respects also stands as a model dairy barn in which are incorporated the features essential for the production of healthy stock and pure milk, namely: light, ventilation, durability, economy and efficiency.

With but two exceptions, namely: the dairy building and sheep barn, there is now the best collection of farm buildings in Canada, which are, in essentials, being copied by a large number of stock breeders.

HORTICULTURAL DIVISION.

It is now twenty-six years since horticultural work was begun at the Central Experimental Farm, and during that time much aid has been given to farmers, market gardeners, and fruit growers throughout Canada by means of reports and bulletins, general correspondence, and by addresses at public meetings, based on the results of experiments conducted. The high regard in which the information obtained from the Dominion Experimental Farms is held is clearly shown by the greatly increased correspondence in recent years in which many questions are asked. The accumulated experience and observation of twenty-five years in many parts of Canada makes it possible to make definite recommendations and give good advice to those who desire it and the losses from which prospective horticulturists have been saved by this means cannot be estimated. Those who have also had long experience look to the Experimental Farms for help.

It is the duty of the Dominion Horticulturist to co-operate with the superintendents and managers of the Experimental Farms, Stations and Sub-stations throughout Canada and give them as much help as possible so that there will be a development in the horticultural work in the directions most likely to aid the people in those parts of Canada which the stations are intended to serve. In 1912 the Dominion Horticulturist was able to visit most of the farms and stations twice.

At the station at Charlottetown, Prince Edward Island, there are now good plantations of tree fruits, small fruits, ornamental trees and shrubs and herbaceous plants, and the information already available from the experience with them is of much value. A number of varieties of grapes have been found to ripen well, and while grape-growing may not become a commercial industry there the fact that certain varieties can be grown successfully makes it possible to have an abundant supply for home use.

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At Nappan, Nova Scotia, the great advantage of protection from the high winds which occur in many parts of Nova Scotia has been already shown. There has been a marked difference in results in protected and unprotected orchards. It has been shown that fruit growing can be developed much more than it is in these northern counties. The trees in a young orchard recently planted with varieties of apples which have been found to succeed best after over twenty years' experience did well in 1912, and it is proposed to carry on cultural experiments here.

There were twenty-one acres of orchard planted in 1912 at the new station in the Annapolis valley at Kentville, N.S. In this orchard are represented practically all the best commercial varieties grown in Nova Scotia and in sufficiently large numbers for a commercial test. It is the intention to carry on cultural experiments on an extensive scale here as the fruit industry is a very important one in this part of Nova Scotia.

The Dominion Horticulturist visited the new station at Fredericton, New Brunswick, in the autumn of 1912, and planned with the superintendent where the future horticultural experiments would be carried on. It is proposed to make potato experiments an important feature of the work here, and experiments will be begun in the spring of 1913.

The Experimental Station at Cap Rouge, Quebec, situated within a few miles of the city of Quebec, should in addition to its usefulness to the province as a whole, prove of great value from a horticultural standpoint to the people of that vicinity who desire to supply fruit and vegetables to the cities of Quebec, Montreal and other towns of the province, and who should grow more and better horticultural products for home use. The orchards and small fruit plantations did well in 1912. A special effort was made, with good success, in supplying a considerable quantity, to the city of Quebec, of assorted vegetables in hampers, as an example to the market gardeners of the vicinity.

It is proposed to do the first planting at the Experimental Station at St. Anne de la Pocatiere, P.Q., in the spring of 1913, and material for an orchard of apples, pears, plums and cherries has already been ordered.

At the Central Experimental Farm the many lines of experimental work which are in progress were continued in 1912. A number of these experiments were given in some detail in the report of last year. More new and promising apples fruited in 1912, and some excellent seedling strawberries have been named and are being propagated for test in other places. The fruit crop at the Central Experimental Farm was good in 1912.

More attention is being paid each year to horticulture at the farms and stations in the prairie provinces at Brandon, Indian Head, Lethbridge, Lacombe, Rostern and Scott. The thousands of new settlers coming in every year, and those who have been some time in the country, are many of them anxious to grow fruits and vegetables for their own use and apply to these farms for information. It is also gratifying to know that many of the older settlers are seeking advice in regard to trees, shrubs and herbaceous plants that will help them to improve the outside appearance of their homes. The older farms have now a large fund of reliable information which they give freely to all who ask for it.

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In British Columbia there are now three Experimental Farms and Stations. At the Experimental Farm at Agassiz on the lower mainland, fruit growing was for more than twenty years made an important part of the work. It was recently decided, however, that for the lower mainland dairying should be given the most prominence. In 1912 material was ordered for a demonstration horticultural orchard and garden to consist mainly of the varieties which had been found to succeed best in previous years and to be regarded as a plantation such as a farmer would set out for home use. Experiments with ornamental plants were conducted on a larger scale than usual in 1912 as this part of British Columbia is particularly suited for flowers and ornamental trees. Experiments with vegetables are also carried on here.

At Invermere in the Columbia River valley where an Experimental Station was recently established, material was sent in during the autumn of 1912 for an orchard and small fruit plantation to be set out in the spring of 1913. It is planned to try cultural experiments here with and without irrigation. Potato experiments will be given prominence.

At the new Experimental Station at Sidney, Vancouver Island, considerable horticultural work will be done. Material for small fruit plantations, vegetable experiments, including potatoes, flowers and ornamental trees and shrubs were ordered in 1912 for planting in 1913, so that experimental work will soon be in progress.

In May, 1912, the Dominion Horticulturist was sent to England to represent Canada at the Royal International Horticultural Exhibition held at London during that month. This was the greatest horticultural exhibition ever held in any country and much information was obtained that has and will be put to good use in Canada. As President of the Society for Horticultural Science, an international society representing the leaders in horticultural investigation in America, the Dominion Horticulturist delivered the annual address at Cleveland, Ohio, in December, 1912, his subject being 'The Relation of Climate to Horticulture' and among other things, was able to show how suitable a climate there is in many parts of Canada for the cultivation of fruit and vegetables. Other important meetings were also attended throughout the year.

CEREAL DIVISION.

The season of 1912 was even less favourable for cereals than that of the preceding year. Some large areas of country suffered considerably from drought and excessive heat in the early part of the summer. Afterwards the weather changed completely and became cool and wet. These conditions prevailed over almost the whole of Canada. The ripening and harvesting of grain crops were most seriously delayed, and much of the seed was badly injured while in stock. In many districts the hot dry weather of early summer caused the young plants of cereals to send out a small number of heads rather prematurely and, when the rains came and stooling of plants followed, a large crop of late heads was produced. These, though too late to ripen, grew to greater height than the earlier heads; so that when the first heads were ready to be harvested they were almost hidden beneath a mass of green stalks.

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Under such conditions it became extremely difficult to make proper observations on dates of ripening. The yields obtained were also misleading in some instances. Early maturing varieties suffered most, as they were farther advanced (and therefore less capable of recuperating) when the wet weather set in.

The first severe frost came rather later than usual, so that the results of the season were not so disastrous as might have been expected. There was, however a general lowering of the quality of the grain, which was particularly serious in grain intended for seed purposes.

Under such adverse conditions the usual progress in cereal investigations and in the propagation of the best new varieties and selections for introduction could not be made. But the year was by no means unfruitful of results.

MARQUIS WHEAT.

As in previous years this magnificent variety again demonstrated its superiority over all other sorts in the great wheat growing provinces. While in a few cases it suffered so severely from the hot weather that the yields obtained were less than from Red Fife, such instances were quite exceptional. As a rule Marquis outyielded Red Fife by a large margin and ripened, of course, a week or two earlier. Marquis again won the highest award in international competition. At the International Dry-Farming Congress held in Lethbridge, the champion wheat was an exhibit of Marquis grown in Southern Alberta.

A new plot record for spring wheat was obtained with Marquis at Indian Head this past season, when a 1-40 acre plot gave a crop at the rate of over 81 bushels per acre. This is probably a world's record for spring wheat.

It is most gratifying to know that Marquis wheat has been propagated by thousands of farmers with such rapidity that it has been possible for everyone who made the effort in good time during the past winter to secure at least a few bushels of seed. The general recognition now given to this variety is noteworthy, when it is recalled that Marquis wheat was introduced into Saskatchewan in 1907, when about half a bushel of seed was sent from Ottawa to the Indian Head Experimental Farm for trial.

PRELUDE WHEAT.

Small fields and plots of this new and extraordinarily early variety were grown last season at the various experimental farms in those localities where early sorts are required. A few small samples were also sent out to private individuals for test elsewhere. The results have been most gratifying, and show that this most recent introduction by the Dominion Cerealists will be of very great value over large tracts of northern country, for which heretofore no variety of wheat which would ripen sufficiently early has been available. The regular distribution of Prelude wheat to the farmers in five-pound samples was begun this winter. The stock of seed was not large, and consequently much care was needed to send the wheat only to those localities where it was particularly needed. Over two hundred samples were distributed. Provision has been made to grow a good acreage of Prelude wheat this year, so as to have a large stock for distribution next winter.

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ANNUAL DISTRIBUTION OF SEED GRAIN.

The seed distribution is being carried on during this season in a manner similar to that of last year. All the grain sent out is grown with the greatest care, so as to be free from admixture with other varieties, and after threshing it is thoroughly cleaned and hand-picked, if necessary, so as to bring it up to the highest possible standard of purity. By sending out only seed of the best varieties and of extraordinary purity and by the enforcement of reasonable regulations, so that applicants for samples shall be taught the value of good seed, the whole system of distribution has been placed on a much better basis, and cannot fail to be of greatly increased advantage to the farmers of Canada.

CROSS-BREEDING AND SELECTION OF CEREALS AT OTTAWA.

The cross-breeding and selecting of varieties of cereals has been continued at Ottawa. Some crosses were made last summer in which a new, beardless barley was employed as one of the parents. No really satisfactory beardless barley has ever yet been offered to the public, and it is hoped that some of the new sorts now being produced at Ottawa will prove of quite superior quality. Crosses were also made between some of the best of the Cerealists' new varieties of wheat, to see whether still further improvements may not be obtained. Among these the greatest interest will probably be taken in the crosses between Marquis and Prelude wheats, among the progeny of which it is hoped that a new wheat may be secured combining the best points of the two parents and showing advantages over either of them for certain sections of country.

DIVISION OF CHEMISTRY.

The past year has witnessed a considerable increase in the work through which the Division seeks to instruct and advise the individual farmer. There is much of value to be learnt from chemistry regarding the composition and properties of soils, manures, fertilizers, fodders and feeding stuffs, spraying materials, &c., &c., and it has been the constant endeavour to make the division more and more useful as a bureau of information in such matters. It is, therefore, gratifying to note the increasing appreciation of our farmers of this important and directly educational feature of the work.

The samples received for examination during the year numbered 2,821. They comprised soils, fodders, and feeding stuffs, naturally occurring fertilizers, insecticides and fungicides, well waters and other matters of an agricultural nature. While the investigations of the Division furnished a proportion of these samples, the larger number were sent in by farmers, good evidence that our agriculturists are realizing the value of chemical assistance in their work.

The investigatory work, as heretofore, has covered a wide field and the results therefrom have thrown light on many of the problems encountered in general farming, and also furnished useful information to those engaged in one or other of the specialized branches of agriculture, such as fruit growing and dairying. Several important

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researches under study for a number of years past have been continued, such as the economic maintenance and increase of soil fertility, the conditions which lead to the control of soil moisture and the influence of environment on the composition of wheat and in addition certain new investigations have been inaugurated which, it is expected will furnish results of value to Canadian agriculture.

The Nitrogen-enrichment of Soils.—The study of soils in the field and in the laboratory prosecuted by this Division, has indicated that nitrogen is the plant food constituent which above all others determines fertility, that it is the dominant element in so far as food is concerned, affecting growth. Further, it is of all the elements furnished by the soil to the crop the one that is most quickly dissipated by irrational methods of farming. These conclusions have given a special impetus in the carrying on of investigations towards the maintenance and increase of the nitrogen content of soils, on the farm, in the orchard and under conditions of management and climate of a special character.

The value of the legumes, clover, alfalfa, vetches, etc., as nitrogen enrichers has been determined in several ways by this Division during the past quarter of a century. One of the investigations in this connection, that has been in progress for ten years may be briefly referred to, as the results obtained are very significant. A plot of light, sandy soil, too poor at the outset for profitable farming, was supplied with available phosphoric acid and potash and inoculated with a clover culture. It was then sown with common red clover, which as it grew was cut and left on the ground. Every second year the plot was dug and resown to clover. Analyses of the soil have been made from time to time and each analysis showed that in spite of losses consequent upon cultivation there was an increase in the nitrogen content. At the end of ten years it was found that an average annual gain of 50 pounds of nitrogen per acre had been made during that period, or in other words, the surface soil in that time had doubled its nitrogen content a result that furnishes proof of an indubitable character of the practical value of clover in the rotation.

Closely related to the foregoing, another experiment was started last year (1912) on the Central Farm, using a series of plots upon which a rotation of clover, grain and corn or roots would be followed, no manure being applied. This series, from crop yields and analysis of the soil, will it is expected give valuable data as to the up-keep of soil fertility for those whose supply of manure is limited and show how far it may be possible, on a sandy loam, to maintain productiveness by this procedure—that is, simply by the introduction and periodic growth of a leguminous crop.

The facts as regards the practical benefits from the use of ‘cultures’ and of soil from fields bearing a leguminous crop for inoculation purposes, as gathered from our experiments in various parts of the Dominion, have been collated. They show that on the whole more satisfactory results may be expected from inoculation with soil—applied at the rate of from 100 to 300 lbs. per acre and harrowed in at the time of seeding—than from the prepared cultures found on the market. They further indicate that inoculation is not so generally necessary as was at one time thought but that failure to obtain a good catch of clover is frequently due to an uncongenial condition of the soil, such as sourness, deficiency in lime or want of sufficient moisture to sustain the young and tender crop.

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Canadian Soils.—Some additional knowledge regarding the soils of the Dominion has been gained by the analysis of samples representative of certain unfilled areas in the various provinces.

Conservation of Moisture.—The experiments instituted on the western experimental farms with the view of ascertaining the influence of various cultural operations and croppings on the moisture content of the soil, have been continued. This important and difficult problem will yet require years of patient and laborious work, but already there is some proof of the value of early and deep ploughing and of frequent surface cultivation for the storing and conservation of the moisture in regions of sparse precipitation. The protection furnished by certain forage crops, as for instance peas and oats, against surface evaporation has also been shown.

Naturally-occurring Fertilizers.—In this connection attention has been more particularly directed during the past year towards the use of ground limestone as an amendment. There seems little doubt but that this material will be found of value for sour soils and those deficient in lime, both clays and sands. It may also be expected to improve peaty and muck soils. In many cases it would be a cheaper and safer material than quick lime. As efficiency will depend on the percentage of carbonate of lime present and the degree of fineness to which the limestone has been ground, these determinations have been specially made in the examination of a number of samples submitted to the farm laboratories, and which have been sent from several of the eastern provinces as well as from British Columbia.

Fodders and Feeding Stuffs.—A considerable amount of analytical work has been accomplished in the valuation of feeding materials of various classes. The information thus afforded should be found useful by farmers, who in these days of high values, must in some measure at least seek to correlate nutritive properties with current prices, if due economy in feeding is to be practiced.

The influence of heredity as affecting the feeding value of mangels has received further study and the results have emphasized that very considerable differences exist between varieties commonly sown. This shows that not only should yield and keeping qualities be considered, but that composition and feeding value as determined by analysis should also be ascertained by those growing this valuable crop. As an example of this research it may be stated that the Gate Post or long red variety proves on examination to be much superior to the Yellow Globe, both in dry matter and sugar.

Sugar Beets.—The leading varieties of factory sugar beets have been grown on the experimental farms and stations throughout the Dominion and the product examined as to purity and sugar content. The data give evidence of the possibility of growing excellent beets in many widely distant parts of Canada.

The Fertilizing Value of Rain and Snow.—This investigation, which has for its object the estimation of the nitrogen compounds in the precipitation at Ottawa, was begun in 1906. For the year ending February 28, 1913, the rain furnished 4.663 lbs. and the snow 1.479 lbs. per acre.

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The Water-supply of the Farm Homestead.—Examination of waters from farm wells has from the first been a feature of the work of this Division. It has been one of great usefulness and has lead to a marked improvement in the water used on the farm and, in the creamery and cheese factory throughout the country. During the year 279 samples of such waters were examined and reported on.

Meat Inspection Division, Health of Animals Branch.—The work in connection with this Division consists in the chemical and microscopical examination of samples collected under the direction of the Veterinary Director General at the various packing and canning houses in the Dominion. During the year 185 such samples have been analysed and reported on. They comprised preserved meats, lard, beef, fat, tallow, fillers for sausage, dye stuffs and colouring matters, preservatives and pickling solutions, spices and condiments. This work constitutes a control of great value in connection with the wholesomeness of the products of Canadian packing houses and canneries.

A number of investigations, more or less closely related to agriculture and rural economy, have been referred, as in past years, to this Division by several departments of the government service having no provision for chemical work. In this way, valuable assistance has been given towards the solution of several problems of wide importance.

DIVISION OF ENTOMOLOGY.

The work of the Division of Entomology has comprised: The administration of the regulations under the Destructive Insect and Pest Act which includes the inspection and fumigation of nursery stock and other vegetation entering Canada, and the suppression of the brown-tail moth in the provinces of Nova Scotia and New Brunswick; the administration of an appropriation for the care of the Indian orchards in British Columbia; the carrying on of investigations at field laboratories located in certain of the provinces; the investigation of forest insects and their depredations; the answering on inquiries and the giving of advice concerning insects affecting farm, orchard and garden crops, forest and shade trees, live stock, grain and stored products and public health; the identification of collections of insects for individuals and educational institutions and the classification and arrangements of our own entomological collections; the carrying on of investigations upon the life histories of insects and the study of binomical questions in relation to the problems of insect control.

Under the Destructive Insect and Pest Act upwards of four million imported trees and plants were inspected. The necessity and value of this inspection was indicated during last year's work by the discovery by our officer at Vancouver of egg masses of the gipsy moth on an evergreen shrub imported from Japan. Several hundred caterpillars which we obtained from these egg masses, sufficient to start a serious outbreak of the insect. The increase in the number of trees imported into western Canada and which require fumigation is now so considerable as to necessitate the provision of an additional port of entry and fumigation station at North Portal, Sask. Additional precautions to prevent the introduction of the gipsy moth on forest products from the infested New England States were taken by requiring shipments of such products to be accompanied by a certificate of inspection. In order to prevent the introduction

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of the Mediterranean Fruit Fly the importation of non-canned fruit from the Hawaiian Islands was prohibited. The Brown-tail Moth constitutes a serious problem in eastern Canada. While we are succeeding in maintaining control of it in Nova Scotia, the infested area in New Brunswick was found to be about 6,400 square miles in extent although only 2,452 winter webs of this insect were collected in that area. Efforts are now being made to introduce and establish in Canada certain of the European parasites of the Brown-tail and Gipsy Moths which have been successfully imported from Europe and colonized in the New England States Department of Agriculture whose co-operation in this effort I am pleased to gratefully acknowledge.

During the year a very distinct advance in the work of studying injurious insects and the methods of control was made by the establishment of entomological laboratories in different parts of Canada where serious insect pests occurred. By these means investigations of decided practical importance on insects affecting fruit trees and field crops were carried out in Nova Scotia, New Brunswick, Quebec, Ontario, both in the Niagara fruit district and in the western part of the province, and in British Columbia. The officers in charge of these laboratories were able to render valuable assistance to the farmers and fruit growers by giving addresses at meetings and personal advice. Owing to a serious outbreak of cutworms in southern Alberta which resulted in the destruction of about thirty to forty thousand acres of grain, arrangements have been made to carry out investigations in that region.

Considerable attention has been devoted to the study of insects affecting forest trees. The Assistant Entomologist in charge of forest insect investigations made visits to the Riding Mountains Forest Reserve in Manitoba, the Algonquin National Park and certain parts of Quebec for the purpose of studying insect damage. The fact that this aspect of forest protection has not been previously studied in Canada renders a large amount of preliminary work necessary. An attempt is being made to introduce and establish the useful parasitic enemies of the Larch Sawfly from England.

The distribution of the Rocky Mountain Spotted Fever Tick was studied, and it was found to be fairly common in southern British Columbia. Investigations on the Stable Fly, which has been shown to be a possible disseminating agent of infantile paralysis (Poliomyelitis), were also commenced, and a vigorous campaign against the House Fly was continued.

In August the Dominion Entomologist attended the International Congress of Entomology at Oxford, England, and afterwards attended a conference at the Colonial Office at which a scheme was worked out for Imperial co-operation in preventing the spread and furthering the investigation of injurious insects throughout the Empire. An Imperial Bureau of Entomology has been formed in London, and it is to be maintained by the Dominions, Colonies and the Colonial Office. By the collection of information and the co-ordination of effort it will undoubtedly be of material assistance to the various parts of the Empire in their efforts to control and prevent the introduction of insect pests. The Dominion Entomologist and his assistants have made visits to various provinces for the purpose of investigation and to deliver addresses before agricultural and other associations during the year.

DIVISION OF BOTANY.

This Division deals annually with numerous enquiries received from farmers who seek advice concerning the identification and eradication of noxious weeds, and who present their requests for information about diseases affecting their various crops. Among the most important diseases known are the various grain smuts, which annually cause an immense loss. It has recently been estimated that the losses in Canada from smut diseases of grain amount to some \$16,000,000 per annum. During the past few years the staff of this Division has carried on researches into certain points of the life history of smut fungi causing these diseases, with the view of ascertaining and proving the best methods of control. A bulletin dealing with this subject is now being prepared and will shortly be ready for distribution.

The potato crop of the Dominion is also subject to a large number of specific maladies, some of which cause considerable damage to the growing crop, while others destroy from 5% to 30% of the potatoes after they are placed in storage. Considering the total harvest of potatoes during 1912, which is valued at \$32,173,000, these losses are considerable. In order to investigate the question of a satisfactory control of such destructive diseases the Dominion Botanist has carried out during the last season an experiment on a field of four acres with the object of providing potatoes free, or as free as possible, from disease. The results of this experiment, which will be carried on for a number of years, will eventually be published, and it is hoped will result in an improvement in the practice of potato growing.

Careful inspection is being carried on throughout the more important potato growing centres, with a view to guarding this industry from an invasion of potato canker, a destructive disease of European origin. Every precaution has been taken to prevent the introduction of this disease by means of seed potatoes imported from England. The fact that this disease was discovered early in the spring of 1912 in some shipments from England made it necessary, in order to protect the Canadian growers, that the importation of potatoes from Europe should be prohibited by an Order in Council. The danger, however, has by no means passed, and it is very desirable that the farmers join the Department in its efforts and immediately communicate with the Dominion Botanist in case any suspicious signs become noticed.

Another phase of the work of this Division is the investigation of diseases affecting various orchard and fruit crops. In order to pay the closest attention to the practical means of control of various destructive diseases, I have caused a field laboratory to be established in St. Catharines. The work of this laboratory is under the direction of the Chief Officer and is in charge of a competent pathological assistant who devotes his time to a close study of the particular needs of the fruit growers in this important district. While, of course, during the short time of the establishment of this laboratory no definite conclusions have been arrived at as regards the various diseases which are studied, it has been shown by the keen interest taken by the fruit growers in this work, and by its progress, that the laboratory serves a very desirable purpose. It is a great advantage to be able to carry out experiments of this kind in the orchards themselves, instead of conducting them in a central laboratory where the conditions

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for investigation are very different. Besides, the daily intercourse of the trained specialist with the fruit growers is found very instructive. It is hoped that the work in this direction will be considerably extended.

The scientific laboratories of the Division at Ottawa being well equipped for researches of mycological and bacteriological character, have been used this season for conducting an inquiry into the bacterial contamination of the milk produced at the Central Farm. After a close study of the sources of contamination, and the elimination of the same as far as practicable, the purity of the milk not only came up to the highest standard, but surpassed any natural milk produced.

The usual progress was made in adding to the various scientific collection of the Division. The usefulness to the general public of the Botanic Garden which is now attached to this Division has been greatly increased by the display of conspicuous labels on the various trees and shrubs and other plants.

Part of the work devoted to the improvement of fodder plants and the experimental plots has been transferred to the newly created Division of Agronomy. The work of the Division of Botany as a whole may be considered as having made important progress in its varied phases.

POULTRY DIVISION.

In conducting the experimental work of this Division, during the year, as in many years past, the object was to obtain such information as would aid the farmers of the country in making the poultry branch of their farm work a profitable one. With this object in view, the experimental effort was directed to the feeding of such rations as were likely to secure a profitable egg yield during the winter season—the period of highest prices—and later in the year, the hatching of a number of chickens, which would make a superior quality of poultry.

The experimental work of the last year went to confirm conclusions arrived at in previous years, particularly the two following respects, viz.:—

That the better quality of poultry can only be produced by rearing chickens of the best utility types. In order to have the best results, it was clearly shown that chickens require to be carefully looked after, and regularly fed, from time of hatching to the saleable age. It is to be borne in mind that chickens which are allowed to pick up their own living, a practice too common among many poultry breeders, do not make the best specimens.

The call of the cities is loud and insistent for strictly new laid eggs, and for which the consumers are willing to pay the best price. By the establishment of egg circles in different parts of the country, it is hoped that farmers will be aided to more immediately reach the consumer and so obtain the best value for his product. A better price should certainly prove a greater incentive to production. For the better quality of poultry there is also a great demand at paying figures.

In the report of the Poultry Division of the Central Experimental Farm for 1912 will be found detailed information as to prices, purchasers, etc. Producers are also shown the best means of obtaining both eggs and poultry at the proper seasons.

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A feature of the experimental work of the past year was continued trials of the fresh air, or open front poultry houses, and which method decidedly showed its superiority to the closed or partly warm system of keeping poultry, so much in vogue during past years. There are several styles of fresh air houses, such as the Cotton Front House, the Woods, and the Tolman, all of which have shown more or less merit, but none has given more satisfaction than the Cotton Front house, which is cheap and easily constructed. Further experiments in this and other styles of poultry houses are looked forward to with interest.

A large and rapidly growing correspondence is proof of the greater interest that is being taken in the poultry branch of agriculture throughout the country.

THE TOBACCO DIVISION.

During the year the Tobacco Division was added to the Dominion Experimental Farm system.

Tobacco-growing was carried on during the season at Ottawa and at Harrow in Ontario, and at St. Jacques l'Achigan and Farnham in Quebec.

The plantation at Ottawa is about $1\frac{1}{2}$ acres in extent, a considerable portion of which is used for the production of seed, which is sent out to growers anxious to try the best varieties. The demand for these samples is constantly growing, some 3,600 packages having been sent to all parts of Canada during the year.

At St. Jacques l'Achigan, a fairly satisfactory crop was harvested, consisting of Comstock, Cuban and Aurora.

At Farnham, it being the first year that tobacco has been grown on this newly-acquired property, its production was somewhat difficult, owing to the poor preparation of the soil, and the returns were not very good in some cases. Very remunerative crops of Big Ohio and Sumatra, however, were obtained. Other varieties grown were Yamaska, Havana Seed Leaf, Brazil, Comstock Spanish, Rusticas and Cuban.

At Harrow, Burley is the principal variety grown, and a very satisfactory amount per acre was harvested.

DIVISION OF FORAGE PLANTS.

Since the establishment in the spring of 1912 of the special Division of Forage Plants it has been possible to pay more attention to the work with Forage Plants and Forage Crops than heretofore. The work of the Division of Forage Plants includes at present work with grasses, clovers and other leguminous forage plants, field roots and Indian corn.

The comparative tests of different varieties of the above groups which have been conducted during a number of years have been continued.

In addition to the comparative tests of old so called varieties of different grasses and clovers a new line of work has been started: improvement by means of selection of individual plants.

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During the summer of 1911 it was observed that there existed within Red Clover, Alsike Clover and Timothy a remarkable individual variation as to the characters of the seed. While in a given plant all seeds formed proved to be of the same general size, colour, shape, etc., the differences between the seeds produced by different plants proved to be extremely great. The practical outcome of the existence of different seed types as indicated above, makes it likely that it might be possible by proper breeding varieties of clovers and grasses with a distinct type of seed, which could be checked as to trueness of name from their seeds.

With a view of producing high yielding strains of Timothy characterized by a certain seed type the seed of a number of especially selected plants has been sown in flower pots separately. From each lot of seedlings thus obtained a certain number has been selected and planted in the field for further study. Over twelve hundred individual plants of Timothy are thus grown at present.

Similar work with Red Clover and Alsike Clover has also been started, though on a smaller scale.

EXPERIMENTAL STATION, CHARLOTTETOWN, P. E. I.

Seeding was backward in Prince Edward Island in 1912, commencing at the Station on May 11 and growth was slow until the end of June. Heavy rains in July and August injured much of the hay crop and also the early grains. Later crops matured very slowly, but were well filled. Potatoes were a good crop, as were turnips and carrots. Corn, musk-melons and sugar beets were rather better than the previous year.

Some very good seed was got at several small cultivating properties, were added to the Station.

A sheep barn 100 feet by 20 feet and two portable poultry houses were built.

EXPERIMENTAL STATION, FREDERICTON, N.B.

The properties purchased for this Station, about 400 acres in area, are within the limits of the City of Fredericton and front on the St. John river. The Station is crossed by the C.P.R. and the St. John Valley R.R.

Considerable clearing and some ditching were done in the autumn of 1911 and during the winter. The work of getting the land in shape for crops, erecting buildings, setting out orchards, etc., will be continued this season.

EXPERIMENTAL FARM, NAPPAN, N.S.

The spring at Nappan was dull and cold, with some frosts in April. May was cold and dry until the last week, when the rainfall was heavy. Seeding was not general until about the 15th of that month.

From July 22 until the end of August, rainfall was almost continuous, making haying almost impossible, and greatly injuring the grain and root crops. The remainder of the season was suitable for harvesting and fall work, no frost being registered until Nov. 30.

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Grain and roots were a fairly good crop, but corn was very poor, owing to the cool, wet weather.

EXPERIMENTAL STATION, KENTVILLE, N.S.

This Station has been increased in area by the purchase of 44 acres, making its total area 294 acres at the present time.

During the past year eight buildings were put up, namely a barn, root house and silo, a carriage house, a dairy, a greenhouse, a poultry building, a double tenement house, a foreman's house and a house for the Superintendent. These are all wooden buildings, most of the material for which was cut on the Station.

Clearing has been actively carried on and also grading and road-making. An area of some 100 acres is taken up by a ravine about one and one-fourth miles long and heavily wooded. This will be reserved as a natural park.

About eighteen and one-half acres of orchard have been set out.

EXPERIMENTAL STATION, STE. ANNE DE LA POCATIERE, QUE.

The season at this Station was very cold and wet, and crops, which were harvested with great difficulty, were, as a rule, poor in quality and low in yield.

No suitable buildings have yet been erected here, those which were on the Station when purchased having been made to serve for the time being, but it is planned to build during the coming season.

Considerable machinery has been purchased, and five horses are employed at present for the farm work. Water has been piped to the farm and will be laid to each of the buildings when erected. Roads along the farm frontage have been improved and a large amount of fencing and draining done. Stone has been gathered from the fields for use in building operations. No experimental work was carried on here this year.

EXPERIMENTAL STATION, CAP ROUGE, QUE.

The season of 1912 was a very unfortunate one, and all crops except hay were below the average.

Continual rains during May and the first half of June delayed seeding, and most of the oats were sown during the first half of the latter month. This was followed by a drought until the end of July. Wet weather during August, September and October retarded haying and harvest and injured the quality of the grain, much of it being rendered unfit for seed. Corn was practically a failure.

Seven acres were added to the area under orchard this year. A granary was erected and also a workshop. Work was commenced on a water system for the farm buildings. Some seven acres were stumped and ploughed, about 8,000 feet of tile drain laid and the ditching done for 3,000 feet more.

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EXPERIMENTAL FARM, BRANDON, MAN.

The growing season at Brandon was one of extremes, wet and cold delaying seeding, while June was extremely dry. Wet weather then prevailed until the end of September, greatly hindering harvesting and thrashing and lowering the quality of the grain.

Experimental work with different rotations and with various cultural methods was continued, and also experimental feeding of steers and lambs.

No new buildings were erected here this year.

EXPERIMENTAL FARM, INDIAN HEAD, SASK.

As a rule, grain crops gave good returns. Fall wheat, which does not usually succeed here, gave a good yield, though the sample was only fair.

During the year a larger horse stable, to replace the one destroyed by fire, was erected, and a new silo put up. A granary was also built, and an implement shed for the larger machines. Before winter set in, a beginning was made on the cement work for a barn.

EXPERIMENTAL STATION, ROSTHERN, SASK.

Seeding began here on April 10, and crops did well until dry weather set in early in June. Later rains caused fresh growth, with consequent uneven maturity at cutting time. The wet weather of August, September and October hindered harvesting, but the long season enabled producers to be enabled to harvest in November.

The cultural and rotation work begun in 1911, was got more fully under way.

A contract was let for a new barn at this Station and some progress was made with the cement work before winter set in. The building will be completed during the coming summer.

EXPERIMENTAL STATION, SCOTT, SASK.

Seeding operations commenced on April 12. Weather conditions during the early part of the season were favourable, on the whole, but heavy rains in July caused a second growth resulting in much immature grain. The season for fall work was short, ploughing being stopped by frost on October 31.

The area devoted to horticulture was enlarged and considerable planting, including a new orchard, was done.

An implement shed, 70 feet by 25 feet was put up.

EXPERIMENTAL STATION, LACOMBE, ALTA.

The first seeding was done at Lacombe on April 15, growth was rapid but maturity and harvesting were delayed by wet weather. The precipitation for the year, 23.64 inches, was the heaviest on record.

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During the year 360 acres were added to the Station, which now comprises about 520 acres in all. This additional area will furnish much needed room for horticultural, cereal and field work and will also provide range and forage for live stock, which have not hitherto been kept. Eighteen Aberdeen-Angus and twelve Holstein-Friesian cattle were purchased. The total number of cattle on the Station at present is 63.

A commencement was made in establishing a poultry plant and experiments were conducted in the fattening of steers, both with and without shelter, with satisfactory results.

Ten mares were purchased during the season and work in horse-breeding will be carried on.

In connection with the work with cattle, a dairy barn, a beef barn, a storage barn, a dairy and an ice house have been erected, as well as a cottage for the head herdsman.

EXPERIMENTAL STATION, LETHBRIDGE, ALTA.

The season of 1912 opened early at Lethbridge and the first seeding was done on April 1. The precipitation during April, May and June was very light so that crops suffered, especially winter wheat. On the irrigated portion of the Station, water was applied in some cases, as early as May. July, August and September gave a rainfall above the normal and there was some difficulty in curing the alfalfa.

Considerable damage was done in the Lethbridge district by cutworms. Methods of combatting this trouble are to be tested this year by entomologists sent out from the Central Experimental Farm.

As usual, experimental crop production work was carried on, both on the irrigated and non-irrigated portions of the Station. Feeding experiments were conducted with steers and lambs, with good results.

EXPERIMENTAL FARM, AGASSIZ, B.C.

The season of 1912 opened quite favourably, and most of the seeding was completed by the end of April. May was a good growing month, and the hay crop in June was saved in good condition. Harvesting commenced on the Experimental Farm on July 29. Before the grain could be hauled in, wet weather set in, and it was the latter half of August before the crop could be brought from the fields. Although there was much rainfall during the remainder of the growing season, fall work was left in good shape, there being but a touch of frost and no snow during the month of November. The yields of roots and potatoes were good, although the latter were somewhat affected with blight.

The condition of the live stock throughout the year was excellent.

The buildings put up the previous year were painted, the water system was completed, and the dairy building finished, and an ice house built in connection with it. A poultry laying house was erected, as well as a building for entomological work. A boarding house for the men employed on the Farm has been almost completed, and will be ready for occupancy in a month or six weeks.

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EXPERIMENTAL STATION, INVERMERE, B.C.

During the year preliminary work was put under way to get the land ready for crop and the application of irrigation. Thirty-five acres were cleared ready for crop.

A combination barn, stable and granary was built, 46 x 30 feet.

Some twenty-six acres were sown to oats, sixteen to red clover, and four to alfalfa. Two acres of potatoes gave a good return.

Implements and horses have been purchased, and the work of planting and seeding, clearing, etc., will continue as soon as possible this spring.

EXPERIMENTAL STATION, SIDNEY, B.C.

Clearing work has been carried on vigorously at Sidney, and some 54 acres of the most heavily timbered land on the Station have been cleared and fenced. Some crop will be put in during the coming season. An avenue 150 feet in width has been laid out along the north side of the farm, extending from the Victoria and Sidney road to Bazan Bay. It is expected that horticultural work will take a prominent place at this Station, and plantations are already being set out. No buildings have yet been erected.

SUBSTATIONS.

Experimental work was carried on, in addition to that done at the Experimental Farms and Stations proper, at several points in the more northerly parts of the prairie provinces, namely at Fort Vermilion in the Peace River district, Alta., at Grande Prairie, Grouard, and Athabasca Landing, also in Alberta, and at Forts Smith, Resolution and Providence, in the Mackenzie district. Some work in 'dry-farming' was also conducted at the Harper Ranch, Kamloops, B.C. With the exception of the last-named, where the season was very unfavourable, the results obtained this year were very satisfactory, having in view the many difficulties with which the experimenter must contend in these northern localities.

CROPS OF THE DOMINION.

The season of 1912 cannot be said to have been a good one in most parts of Canada. The spring was generally backward and the weather up to the end of May cold and wet, especially in the provinces of Nova Scotia, New Brunswick and Quebec. Fall wheat in Ontario and the West suffered considerably from winter-killing. The unfavourable conditions of May were continued throughout June in eastern Canada and growth was slow as a result. In the west the month was hot and dry, but rains in July improved the prospects greatly. During August and September, wet weather was prevalent throughout the Dominion and harvesting operations were greatly delayed. As late as September 30, large areas of grain both in the east and in the west, were yet uncut or were still in the stook. Damage was done by second growth causing uneven ripening, and by sprouting.

Roots and Potatoes showed a larger yield than that of the previous year, while hay and clover was smaller, due, to a great extent, to the weather being unfavourable at cutting time.

The following table gives the areas and final estimates of yield and value of the principal field crops, as given in the Census and Statistics Monthly for December, 1912.

Areas and Estimates of Yield and Value of Field Crops, 1912.

Crops.	Area.	Yield per Acre.	Total Yield.	Weight per Measured Bushel.	Average Price.	Total Value.
	Acres.	Bush.	Bush.	Lb.	\$	\$
Canada—						
Fall wheat.....	781,000	20·99	16,396,000	60·21	0·84	13,735,000
Spring wheat..	8,977,400	20·37	182,840,000	58·90	0·60	109,787,000
All wheat.....	9,758,400	20·42	199,236,000	59·22	0·62	123,522,000
Oats.....	9,216,900	39·25	361,733,000	35·40	0·32	116,996,000
Barley.....	1,415,200	31·10	44,014,000	47·59	0·46	20,405,000
Rye.....	136,110	19·06	2,594,000	54·84	0·73	1,904,000
Peas.....	250,820	15·04	3,773,500	56·88	1·26	4,771,800
Buckwheat.....	387,000	26·34	10,193,000	47·62	0·62	6,337,000
Mixed grains.....	522,100	34·38	17,952,000	44·48	0·59	10,690,000
Flax.....	1,677,800	12·92	21,681,500	54·88	0·91	19,626,000
Beans.....	59,800	17·40	1,040,800	59·05	2·20	2,291,500
Corn for husking.....	292,850	56·58	16,569,800	55·67	0·62	10,325,400
Potatoes.....	472,400	172·19	81,343,000	.....	0·39	32,173,000
Turnips, etc.....	217,400	402·51	87,505,000	.....	0·23	20,713,000
		Tons.	Tons.		Per Ton.	
Hay and clover.....	7,633,600	1·47	11,189,000	.....	11·07	124,009,000
Fodder and corn.....	287,740	10·26	2,858,900	.....	4·74	13,557,500
Sugar beets.....	19,000	10·74	204,000	.....	5·00	1,020,000
Alfalfa.....	111,300	2·79	310,100	.....	11·65	3,609,900

For the purpose of comparison, the estimate from the same source is given for the previous year, 1911. The tables show that, in 1911, from a total area under crop of 32,404,110 acres, a harvest was reaped which, at local market prices, was worth \$558,099,600. In 1912, from a total area under field crops of 32,449,000 acres, a return was obtained, which, on the same basis of valuation, was worth \$511,951,000.

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Crops.	Area.	Yield per Acre.	Total Yield.	Weight per Measured Bushel.	Average Price Per Bush.	Total Value.
	Acres.	Bushel.	Bushel.	Lb.	\$	\$
Fall wheat... ..	1,172,119	22.19	26,014,000	61.12	.825	21,461,000
Spring wheat	9,201,839	20.63	189,837,300	59.21	.611	117,146,000
Oats	9,219,920	37.76	348,187,600	34.65	.504	129,814,000
Barley.....	1,401,352	28.94	40,641,000	46.97	.566	23,004,000
Rye	112,571	18.89	2,694,400	55.11	.774	2,086,000
Peas	287,135	15.80	4,535,000	59.58	1.025	4,647,700
Broad beans	359,367	22.69	8,155,500	47.32	.641	5,220,000
Mixed grains	1,000,000	29.78	16,679,000	45.10	.607	10,127,000
Flax seed	682,002	11.52	7,867,000	53.29	1.107	11,800,000
Beans	60,630	19.06	1,155,000	58.30	1.020	2,320,000
Corn for husking	316,104	59.39	18,772,700	50.31	.608	11,471,000
Potatoes	459,097	113.82	66,023,000		.60	8,000,000
Turnips &c.	227,141	373.92	94,933,000		.23	10,417,000
		Tons.	Tons.		Per Ton.	
Hay and clover..	7,903,242	1.61	12,694,000		41.00	44,000,000
Fodder corn	285,321	9.02	2,577,200		4.84	12,400,000
Sugar beets	20,878	8.00	177,000		6.58	1,160,000
Alfalfa	101,781	2.14	227,900		9.808	2,240,000

NOTE.—The figures of flax seed represent revised estimates published in the Census and Statistics Monthly of April, 1912.

LIVE STOCK.

It will be noted from the table given below that the estimated numbers of live stock in the Dominion, as given in the Census and Statistics Monthly for July, 1912, show decreases except in the cases of horses and dairy cattle. Figures are given for the five years 1908-12. The condition of all classes of live stock was excellent, the figures given being in comparison with 100 per cent as representing perfect condition.

Statistics of Live Stock on Farms, 1908-1912.

Live Stock.	Number of Animals.					Per cent of Standard Condition June 30, 1912.
	1912.	1911.	1910.	1909.	1908.	
Canada						
Horses	2,336,800	2,266,400	2,213,199	2,132,489	2,118,165	97.43
Milch cows	2,890,100	2,876,600	2,853,951	2,849,306	2,917,746	98.26
Other cattle.....	4,093,600	4,210,000	4,260,963	4,384,779	4,629,836	98.33
Sheep	2,360,600	2,389,300	2,598,470	2,705,390	2,831,404	97.55
Swine	2,656,400	2,792,200	2,753,964	2,912,509	3,369,858	96.09

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HEALTH OF ANIMALS BRANCH.

The resignation of Dr. J. G. Rutherford, C.M.G., Veterinary Director General and Live Stock Commissioner having gone into effect with the close of the last fiscal year, the conduct of the Health of Animals Branch devolved upon Dr. George Hilton, Chief Veterinary Inspector, until the appointment of Dr. F. Torrance as Veterinary Director General on August 1st, 1912.

The officers of the Branch have energetically handled any outbreaks of the diseases enumerated in the Animal Contagious Diseases Act which occurred in Canada, in addition to the work of inspecting every animal entering Canada and the testing with mallein of all horses not accompanied by satisfactory certificates of such test. The supervision of the cleansing and disinfection of stock cars at many large traffic centres has also been undertaken.

Owing to the prevalence of Foot and Mouth Disease in the United Kingdom, it was deemed advisable to refrain from issuing permits for the admission of ruminating animals and swine therefrom for a very considerable portion of the year, consequently the number of pure bred cattle and sheep entering Canada at Quebec was very small. It has recently been found possible to remove this restriction, and importations will be allowed to enter after the close of this fiscal year on March 31.

Glanders is well under control in all parts of the Dominion except the Prairie Provinces, where, however, a determined effort is being made, with the aid of a large force of Inspectors, to bring this most troublesome disease to a more satisfactory basis. The rapid growth of the settlement over a large area and the facility which exists for the coming in contact of infected animals with those showing no evidence of disease but affected with glanders, are great factors to be taken into consideration. That the efforts of the Branch in Saskatchewan, which has always been the most difficult Province to deal with, are being crowned with success, may be gathered from the fact that the number of horses slaughtered has dropped from 722 the previous year to slightly over 400 for the past twelve months. In Alberta there is an increase, due largely to the increased settlement and the larger staff detailed to thoroughly cope with the disease. So many range horses, formerly running on the open prairie, and if suspected, tested en bloc, are now sold to and distributed among the other horses of settlers that, in tracing up contact cases it is necessary to devote much more time and more Inspectors to the work, with the probability of finding more extensive infection than was the case under range conditions.

No Glanders was discovered in British Columbia, while in the province east of Saskatchewan less than sixty infected animals were slaughtered.

Dourine or Maladie du Coit has also occupied the attention of our Veterinary Inspectors in the Prairie Provinces, every possible precaution being taken to ensure rapid quarantine of all suspected cases of this most insidious disease. The number of horses quarantined is somewhat large as compared with those slaughtered, but it has been deemed advisable to hold all contact animals until their freedom from disease is clearly demonstrated. The number of animals slaughtered was, as last year, less than 20, while over 200 were quarantined. A modern Biological Laboratory has

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been constructed at our Dourine Experiment Station at Lethbridge, which has been under the able direction of Dr. Watson, one of the Pathologists of the Branch, for many years past, and the work now being conducted there is of the greatest possible benefit in the detection and increasing our knowledge of this malady.

Mange of Horses and Cattle has been given the special attention of a corps of range riders in Alberta and Saskatchewan, in addition to that of the Veterinary Inspectors under whom they work. A most gratifying diminution in the numbers of cattle and horses found affected can be recorded, considerably less than half the total of horses and cattle quarantined as diseased in the previous twelve months being discovered. The number of animals quarantined as contacts also underwent a correspondingly gratifying diminution of over 50 per cent.

-The conditions existing in the mange area in British Columbia are now sufficiently satisfactory to admit of the removal of the present restrictions, and steps have been taken with that end in view.

Sheep Scab is now practically non-existent, only one outbreak being discovered during the past year, that being in the province of Manitoba, where 62 animals were found to be affected. A thorough inspection of all sheep in the locality was made and steps taken to ensure the dipping of the animals and disinfection of the premises. Many thousands of sheep were imported in the western provinces and a thirty day quarantine was imposed on all those entered except for immediate slaughter.

Hog Cholera has, I regret to state, continued to engage the attention of my officers in western Ontario and the western provinces, eastern Canada still remaining free from the ravage of this disease. Nearly 5,000 hogs were slaughtered in western Ontario, as compared with 1,500 the previous year, while in Saskatchewan the number increased from 153 to nearly 1,400. There were satisfactory decreases in Manitoba from 2,218 to 259, and in Alberta from 316 to 159; but in British Columbia the number slaughtered mounted from 58 to 1,550. Every effort has been made to localize the outbreaks, and rigid quarantines have been imposed on surrounding premises.

It has also been deemed advisable to prohibit the importation, manufacture or use of hog cholera serum in Canada. Every effort is being made to advise hog owners to thoroughly cook garbage before feeding, and the amendment of the Hog Cholera Regulations last year with a view to restricting the feeding of raw garbage has been made thoroughly known and owners advised accordingly.

Rabies has made its appearance in Ontario and Alberta, and stringent quarantines of suspected and contagious premises and dogs thereon have been made. Nearly all the quarantines so imposed have now been raised, and it is hoped that no further outbreaks will occur. 112 premises were quarantined in Ontario, as compared with 123 of the previous year, and 41 were placed under restriction in Alberta.

Tuberculosis has only been dealt with by the testing of cattle for import or export, and those herds placed under the control of the Department. 2,700 tests were applied

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as compared with 1,198 of the previous year the percentage of reactors being only 1% as compared with a previous 5%. 3,500 tests were made by private practitioners, with tuberculin supplied by the Department against 2,238 the previous year, the percentage of reactors obtained being 4% as compared with 11%.

Dr. Hadwen has been engaged in the work of investigating the nature and cause of Redwater among cattle in British Columbia, and is stationed at Agassiz where a Branch Experiment Station has been established.

A complete and up to date Laboratory has also been added to the equipment of the Dourine Experiment Station at Lethbridge, Alta., where much good work is being done in connection with that insidious disease.

The Quarantine accommodation along the boundary has been improved as much as financial conditions would permit, and the work done by the Veterinary Inspectors at the numerous Quarantine ports has been most effective in keeping out contagious disease.

Blackleg and Anthrax Vaccines have been prepared at the Health of Animals Branch, Biological Laboratory, and sold to the public at five cents per dose. A large demand for the former vaccine has been maintained, while fortunately the absence of Anthrax has not necessitated numerous applications for the vaccine in that connection.

THE MEAT INSPECTION DIVISION.

The Meat Inspection Division of this Branch is growing rapidly and carrying on its work effectively with little adverse criticism, the trade in meat and meat food products adjusting itself to the requirements of the Act.

The tremendous increase in the canning of poultry may, I think, be attributed to the protection afforded by inspection.

The staff of Inspectors has been slightly augmented to meet the needs of the service, due to additional establishments being placed under inspection and a gradual improvement in the methods of carrying on the work. The general health and conduct of the officers have been good considering the nature of the conditions under which they labour.

Our exports of meats for the year will show a decrease while our imports are very largely increased, a natural result of the growth in population and decrease in production in the older settled parts of the Dominion.

Prices for the different meat food animals have been good and under present conditions, due to a shortage of live stock, should remain so.

The very limited supply of beef cattle is to be regretted, and this will, no doubt, continue for some time. To a certain extent this condition may be due to the enormous slaughter of calves, the meat of which, while palatable, is not of the highest food value.

The work of the Branch in the supervision of establishments engaged in the canning and preserving of fruits, vegetables and milk, has increased to such an extent as to require the appointment of a number of short term inspectors who, in conjunction with our regular officers, are exceedingly busy during the fruit and vegetable season. The many improvements which may be observed in the sanitary conditions and the methods of handling the raw and prepared products amply justify the expenditure entailed.

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PUBLICATIONS BRANCH.

The Publications Branch deals with the International Agricultural Institute, to which Canada is one of the adhering countries, and with the distribution of the publications issued by the Department.

THE INTERNATIONAL AGRICULTURAL INSTITUTE.

During the year the International Agricultural Institute at Rome continued to issue its three Bulletins: 'Bulletin of Agricultural Statistics,' 'Bulletin of Agricultural Intelligence and Plant Diseases,' and 'Bulletin of Economic and Social Intelligence.' In many ways these Bulletins have been considerably improved.

The Statistical Service of the Institute showed a marked advance over the previous year. A number of countries sent in their preliminary estimates of cereal production a month earlier than before, and reports of acreage and condition were more regularly received. The Russian government has promised to conform hereafter to the Institute's plan and issue its preliminary estimate one month before harvest. At the request of the Institute the adhering Governments have extended their statistical services so as to furnish data concerning flax, sugar beet, tobacco, cotton, silk and wine, and the reports on these products form a valuable part of the Bulletin of Agricultural Statistics. Special attention has been given to official live stock statistics, and the result of live stock censuses in different countries have been published and measures for further development of this service are to be discussed at the forthcoming General Assembly. Since March, 1913, the statistics of imports and exports of cereals, visible supply and prices, published hitherto in the Bulletin of Commercial Statistics, are included in the Bulletin of Agricultural Statistics.

A new feature of the Bulletin of Agricultural Intelligence and Plant Diseases is the inclusion of original articles specially written for the Bulletin by authorities on different subjects relating to agriculture. Of these articles the following might be mentioned: 'The Recent Development of Cattle Breeding in Germany,' by Dr. Hansen; 'Mechanical Cultivation,' by Max Ringleman, Director of the Machine Trial Station in Paris; 'The Basis of an International Agreement for the Control of Plant Diseases,' by Giuseppe Cuboni, Director of the Royal Station of Plant Pathology, Rome.

During the year the Institute issued several valuable special publications. Among these are 'The International Year Book of Agricultural Statistics,' 'The International Year Book of Agricultural Legislation,' 'An Outline of European Co-operative Credit Systems,' and 'A Study of the Census Returns of the Agricultural Population, the Wages of Rural Labour, and the Currents of Emigration in the Several Countries.'

The circulation of the Canadian Bulletin 'The Publications of the International Agricultural Institute', issued monthly by the Canadian Commissioner, increased during the year through individual applications by over 2,500. This Bulletin has been issued since October, 1910, in order to give due publicity to the information con-

tained in the original Institute Bulletins of which only a limited number are received by the Canadian Office. In it are reproduced the articles in the Bulletins of Agricultural Intelligence and Economic and Social Intelligence which are deemed of interest and value to Canadian readers, summaries being made of those articles which are too long for reproduction. In this way from forty to seventy-five articles from the original Bulletins are republished in each number of the Canadian Bulletin. Among the more important of these is an article on the 'Present State of Dairy Cow Testing' giving a description of the methods employed in Milk and Butter tests in Canada, United States and several European countries, the origin and tests of the cow-testing associations and their recent development. 'The Californian Co-operative Fruit Growers' Societies' is the subject of an article in which the benefits to be derived from co-operation among farmers are clearly shown. In an article on the 'International Agricultural Institute and the Organization and Work of the Canadian Office', Mr. T. K. Doherty, the Canadian Commissioner to the Institute, gives a complete account of the work of the Canadian Office since its inception in 1909, as well as a statement of the operations in the Institute and its programme for the future. In view of the great interest in agricultural credit taken by farmers throughout the Dominion, in the February, 1913, number of the Canadian Bulletin special attention was given to Co-operative Credit. An article on Rural Banks in Germany giving a detailed account of the Raiffeisen system of Agricultural Credit was reproduced as well as a description of the Co-operative Land Credit Societies 'Landschaften' and 'Ritterschaften'. The number also contains a summary of the Report of Mr. Myron T. Herrick, United States Ambassador at Paris, on European Land and Agricultural Credit Systems together with President Taft's letter on the subject to the Governors of the States. Other important articles published during the year in the Canadian Bulletin were: 'Report on Dry-Farming', by M. E. de Miklos, Delegate for Hungary on the Permanent Committee of the Institute, and 'The Protection of Birds', by the same author. Considerable attention was given to rural economics especially as regards methods of bookkeeping for farmers, a subject exciting great interest among scientific agriculturists at the present time. Besides these were many summaries of articles and bulletins on Cultivation of Different Crops, Rural Hygiene, Agricultural Meteorology, Physics, Chemistry and Microbiology of Soil, Manures and Manuring, Agricultural Machinery and Implements, Agricultural Botany, Live Stock, Apiculture, Plant Diseases and Noxious Insects, Agricultural Co-operation and Associations, Agricultural Insurance and other subjects.

The first part of the Canadian Bulletin is devoted to agricultural statistics taken mainly from the Institute Bulletin of Agricultural Statistics. The figures which in the original Bulletin refer to hectares and quintals are converted into acres and bushels for the convenience of Canadian readers. A summary of the condition of crops as reported by the Institute is always given, and the tables of area and production reproduced.

On the date of the publication of the Bulletin of Agricultural Statistics at Rome the Institute telegraphs a summary of the more important contents of the Bulletin to the governments of the adhering countries. The data thus received is immediately sent by the Canadian Office to some 500 newspapers throughout the

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Dominion, to the agricultural departments of the provinces and to others specially interested, by means of multigraphed sheets. During the period of harvest in the northern hemisphere the statistics of production thus received are arranged in tables showing the production of the different countries in detail. Canadian readers are thus enabled to obtain the official estimates of crop production at the earliest possible date.

One of the duties of the Canadian Commissioner is to furnish the Institute with the data concerning Canada needed for its publications. About the 12th of each month the crop report for Canada received from the Census and Statistics Branch of the Department of Trade and Commerce is edited for the Institute for publication in the 'Bulletin of Agricultural Statistics.' Articles for the 'Bulletin of Agricultural Intelligence and Plant Diseases,' and of 'Economic and Social Intelligence' have been prepared in the Canadian Office. An example of these is the analysis of the Canada Grain Act, together with an account of the reports, circumstances and conditions which led up to its passage. Among other articles sent to Rome were those on Cow Testing Associations in Canada, and Credit Banks of the Province of Quebec. A report of the Dry Farming Congress at Alberta was also furnished. Specialists outside this Department have also been invited to contribute by communicating articles which they may deem of interest to the Institute in the prosecution of its objects and for possible publication in the Institute Bulletins.

During the year reports on Co-operation, the Manufacture and Consumption of Fertilizers, and Hail Insurance were sent to the Institute.

THE LIBRARY.

The Library of the Publications Branch was established to enable the Commissioner of the Institute for Canada to furnish information to the Institute. Secondly, it renders available to those interested in agricultural subjects the latest Bulletins and reports from the principal agricultural countries of the world.

The publications in the Library have now reached the number of 1,200 bound volumes and over 3,000 pamphlets. With the exception of some books of reference and a small number of important works on different phases of agriculture, the publications have been received in exchange for Canadian agricultural publications. One-third of the books are from the United States Department of Agriculture, the Experiment Stations and State Boards of Agriculture. About one hundred agricultural and statistical periodicals are received and kept on file. These are nearly all received in exchange for publications of this Department.

A monthly statement of additions to the library is printed in the Canadian Bulletin of the International Agricultural Institute.

Cards representing the bulletins and reports of the American Department of Agriculture are arranged in alphabetical order and are available for consultation. Catalogue cards have also been arranged for a considerable part of the rest of the library. Some progress has also been made in arranging the Library of Congress cards of universal agricultural literature.

THE DISTRIBUTION OF PUBLICATIONS.

A short time prior to the beginning of the past fiscal year this Branch was charged with the general distribution of the various publications issued by the several other Branches of the Department of Agriculture, which include the Experimental Farms, the Seed Branch, the Dairy and Cold Storage Branch, the Live Stock Branch, the Health of Animals Branch, and the Tobacco Branch. To this end the individual mailing lists were taken over and arranged according to a uniform system. These several lists which are constantly under revision have been systematically classified on stencils for mechanical addressing and on cards for reference. The several lists, which vary in size from 2,500 for the smallest to 60,875 for largest, comprise 168,292 names, which number is constantly increasing.

As a publication is issued it is immediately sent out to the list of the Branch by which it was produced. In addition it is announced to the public by means of a press notice which consists of a brief review. This is promptly mailed to about five hundred papers which have a combined circulation of considerably more than two million. These notices usually create a large demand for the publication, and along with the copy sent out in response to each request there is sent a return post card which affords the recipient an easy means of applying to have his name added to the permanent mailing list. By means of this system the lists are making a healthy and comparatively rapid growth.

In addition to the bulletins, pamphlets, circulars and reports sent out for the different *Branches*, there was mailed to a list, ranging from 6,000 to 8,500 latterly, the monthly bulletin issued by this Branch, 'The Publications of the International Agricultural Institute,' to a special list of about 280 agricultural scientists the three original monthly bulletins prepared by the International Agricultural Institute, at Rome, as well as large editions of nine pamphlets constituting evidences and papers presented before the Select Standing Committee of the House of Commons on Agriculture and Colonization and the Committee of the Senate on Agriculture and Forestry.

During the year there were sent out to the mailing lists of the respective Branches thirty-six new publications of the Department of Agriculture, four new evidences given before the Select Standing Committee of the House of Commons, five new papers read before the Committee of the Senate on Agriculture and Forestry, besides small editions of the three monthly bulletins of the International Institute at Rome comprising in all nearly one and one-half million copies. In addition there were mailed in response to personal applications some 30,000 copies of publications, including eleven new pamphlets and circulars of a special character and copies of back numbers of bulletins, reports, bulletins, pamphlets and circulars.

In order to help new settlers in the western provinces with agricultural publications the Honourable the Minister of the Interior consented that this Branch should provide Dominion Lands Agents with supplies of return post cards to be handed to prospective settlers. These announce to entrants for homesteads that helpful publications may be had by filling in and mailing the return card. Since many homesteaders have not previously farmed, or have come from countries differing from the

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Prairie Provinces in soil and climate, it is expected that this service will be of great value to them. In accordance with the estimate of the Commissioner of Dominion Lands sixty thousands of these cards have been provided for a year's supply.

MULTIGRAPHING.

Primarily for the purpose of issuing to the Press the cabled monthly world's crop reports of the International Agricultural Institute this Branch some time ago purchased a multigraph machine.

During the past year this has been found useful in issuing reviews of new publications and announcements of changes in government regulations bearing on the agricultural industry.

In addition to the International Institute cables there were sent out during the year 66 articles in the English language and 25 in the French constituting in all 100 pages of matter of which a total of 57,275 sheets were printed. These going to the agricultural press and other newspapers of the country have kept well before the public the work being carried on by the Department of Agriculture as set forth in its published reports and bulletins.

III.—PATENTS OF INVENTION.

The following tables show the transactions of the Patent Office, Department of Agriculture, from April 1, 1912, to March 31, 1913:—

Applications for Patents.	Patents and Certificates Granted.			Cables.	Assignment of Patent.	Notices under Section 8.
	Patents.	Certificates.	Total.			
8,681	7,502	1,120	8,701	353	3,741	1,013

DETAILED STATEMENT, PATENT OFFICE FEES.

Month.	Notices.	Patents.	Assignments.	Certified Copies.	Caveats.	Sundries.	Subscriptions.	Total.
1912.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
April.....	169 75	17,883 75	683 25	233 15	195 00	1 25	58 60	17,244 75
May.....	147 00	17,108 98	635 80	257 85	135 00	16 30	34 80	18,335 73
June.....	130 00	14,864 00	563 75	318 80	180 00	29 00	22 00	16,107 55
July.....	178 00	15,498 90	697 95	285 30	178 20	6 00	27 20	16,821 55
August.....	170 00	15,444 15	691 85	258 61	140 50	14 75	22 20	16,742 06
September.....	214 40	14,785 15	532 75	262 45	150 00	5 50	21 55	15,971 80
October.....	181 10	16,248 05	714 95	366 75	165 15	62 50	38 00	17,776 50
November.....	145 00	16,859 90	719 50	285 85	160 00	12 00	64 10	18,246 35
December.....	158 50	16,213 20	616 65	198 90	156 00	8 50	44 05	17,395 80
1913.								
January.....	164 00	19,512 45	782 35	303 16	190 50	26 00	31 79	21,010 25
February..	164 00	17,044 70	832 50	353 95	180 00	8 00	26 55	18,609 70
March.....	205 25	20,282 40	751 15	277 55	140 00	13 54	213 09	21,882 98
	2,027 00	201,745 63	8,222 45	3,402 32	1,920 35	203 34	603 93	218,125 02

The total number of Patents granted to Canadian inventors was 1,256 and were distributed among the provinces of the Dominion as follows:—

Ontario.	Quebec.	British Columbia.	Manitoba.	Alberta.	Saskatchewan.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Yukon.
584	277	122	105	61	58	25	20	4	0

Patents issued to residents of Canada, with the ratio of population to each patent granted:—

Provinces.	Patents.	One to every.
British Columbia.....	122	3,217
Ontario.....	584	4,320
Manitoba.....	105	4,339
Alberta.....	61	6,142
Quebec.....	277	7,230
Saskatchewan.....	58	8,490
New Brunswick.....	25	14,075
Prince Edward Island.....	4	23,431
Nova Scotia.....	20	24,616
Yukon.....	0	

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NATIONALITY OF FOREIGN INVENTORS.

Countries.	1908.	1909.	1910.	1911.	1912.	1913.
United States of America	5,030	4,602	5,021	4,885	4,997	4 964
Great Britain.	313	346	392	359	506	495
Germany.	214	215	241	304	336	307
Australia.	76	58	60	77	99	75
France.	91	59	75	97	108	100
New Zealand.	31	36	37	33	46	47
Sweden.	46	40	39	54	52	64
Belguim	18	17	20	25	20	23
Austria.	14	33	23	20	24	40
Italy.	14	10	8	12	6	16
Switzerland.	13	11	12	26	23	20
Denmark.	29	8	8	5	14	15
Transvaal.	6	12	12	16	10	7
Hungary.	8	5	7	6	6	6
Russia.	5	4	14	18	6	17
Norway.	13	9	18	20	17	10
Newfoundland.	4	1	2	3	1	2
Netherlands.	0	4	0	0		
Mexico.	4	4	11	7	10	8
Cape Colony.	0	1	0	3	4	4
Chile.	3	0	1	5	1	1
Spain.	0	2	1	3		
Chili.	0	1	0	1		1
Finland.	0	1	0	1		1
Portugal.	0	1	0	0		
Roumania.	0	1	0	1	1	
Grand Duchy of Luxemburg.	2	1	0	0		
Algeria.	1	0	0	1		
Japan.	3	1	2	0	2	2
India.	1	0	0	5	3	1
Natal.	1	0	0	0	1	2
Nicaragua.	1	0	0	1		
Brazil.	1	0	0	2	1	
Turkey.	1	0	0	0		
Poland.	1	3	2	0		
Holland.	10	0	2	11	8	7
Argentina.		4	5	1	1	
Panama (Canal Zone).		2	0	0	3	
Egypt.			1	1		
Southern Rhodesia.			1			
Penn.					3	2
Hawaii.					3	3
Venezuela.					2	1
Trinidad, W. I.					1	
Porto Rico.					1	2
Tunis.						1
Ceylon.						1
Straits Settlements.						1

Statement of the number of patents issued under the Act, on which the fees are paid for periods of six, twelve or eighteen years, at the option of the patentee; and of patents on which the certificates of payments of fees were attached after the issue of patents originally granted for periods of six and twelve years.

Period for which Fees were paid on First Issue.			Patents on which Certificates were attached after issue.		Re-issues.		
6 years.	12 years.	18 years.	6 years.	12 years.	6 years.	12 years.	18 years.
7,469	5	18	1,161	38	9	1	0

COMPARATIVE STATEMENT of the transactions of the Patent Office from 1872, when foreign applications were first admitted, to 1912, inclusive.

Year.	Applica- tions for Patents.	Patents and Certificates Granted.			Caveats.	Assign- ments of Patents.	Fees received.
		Patents.	Certifi- cates.	Total.			
							\$ cts.
1872	752	671	.....	671	184	327	18,651 65
1873	1,124	1,016	10	1,026	171	547	28,889 64
1874	1,376	1,218	27	1,245	200	711	32,962 48
1875	1,418	1,266	57	1,323	194	791	33,380 82
1876	1,548	1,337	46	1,383	185	761	34,429 38
1877	1,445	1,277	75	1,352	168	841	33,656 30
1878	1,428	1,172	96	1,268	172	822	31,992 42
1879	1,358	1,137	101	1,238	203	728	30,863 88
1880	1,601	1,252	156	1,408	227	855	38,334 99
1881	1,956	1,510	222	1,732	226	907	48,083 95
1882	2,266	1,846	291	2,137	198	955	55,854 79
1883	2,641	2,178	291	2,469	242	1,052	67,625 48
1884	2,681	2,456	167	2,623	238	1,772	63,257 47
1885	2,518	2,233	214	2,447	222	1,075	62,176 23
1886	2,776	2,610	250	2,860	187	1,322	67,176 23
1887	2,874	2,596	254	2,850	219	1,335	67,940 21
1888	2,747	2,257	282	2,539	240	1,159	65,246 51
1889	3,279	2,725	355	3,081	221	1,437	78,046 72
1890	3,560	2,428	369	2,797	248	6,307	84,150 78
1891	3,233	2,343	393	2,736	215	1,231	77,723 63
1892	3,176	3,417	415	3,832	242	1,500	77,216 76
1893 (Only 10 months)	2,614	3,153	292	3,445	229	1,345	63,850 19
1894	3,291	2,756	412	3,218	301	1,445	80,682 56
1895	3,387	3,074	422	3,496	343	1,550	86,358 48
1896	3,728	3,488	413	3,901	306	1,420	93,532 52
1897	4,300	4,013	284	4,297	377	1,551	102,117 92
1898	4,200	3,611	262	3,873	363	1,657	99,361 95
1899	3,305	3,151	412	3,563	311	1,467	107,261 56
1900	4,628	4,522	482	5,004	283	1,914	113,852 46
1901	4,817	4,766	551	5,317	302	2,323	120,064 37
1902	5,301	4,391	510	4,901	317	2,339	129,896 82
1903	5,912	5,673	482	6,105	328	2,384	141,363 81
1904	6,061	6,091	517	6,607	303	2,472	145,896 10
1905	6,355	6,111	536	6,647	300	2,576	152,085 45
1906 (Only 6 months)	2,857	2,378	271	2,649	137	1,232	69,700 46
1907	7,077	6,121	634	6,755	285	3,003	169,548 78
1908	7,406	6,774	741	7,518	317	2,900	178,482 49
1909	7,239	6,395	827	7,222	319	3,001	176,692 05
1910	7,789	7,223	1,010	8,233	448	3,147	194,571 54
1911	8,037	7,249	1,002	8,251	406	3,356	200,164 41
1912	8,293	7,399	1,113	8,512	348	3,725	207,762 77
1913	8,681	7,502	1,199	8,701	353	3,741	218,125 02.

There has been a marked increase in all the transactions in this branch of my department during the past year, and it may be remarked that there appears to be a growing activity in inventions and business arising out of them in the prairie provinces, as well as in the province bordering on the Pacific Coast. The correspondence and inquiries from these provinces have increased enormously during the past year, foreshadowing a still larger increase in the issue of patents and other transactions under the law in the next fiscal year.

The total revenue of the Patent Office for the year ending March 31, 1913, was \$218,125.02.

The number of new applications for patents presented during the year was 8,681, an increase over the preceding year of 388.

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The total number of reports issued by the examiners during the year was 11,551, an increase of 517, and 10 patents were surrendered and re-issued.

Out of the total number of patents granted by this office during the year there were 4,964 issued to inventors, or assignees resident in the United States, being 63 per cent. of the whole issue.

This branch of my department continues to receive the official reports of patent from Great Britain, Australia, New Zealand, United States, Mexico, Portugal, Italy, Belgium, France and Japan, in addition to other periodicals of a scientific nature, in exchange for the Canadian Patent Office Record.

There were 1907 patents brought under the conditions of the Compulsory License Clause, Section 44, of the Patent Act, an increase of 118 over the preceding year.

The number of notices under Section 8 of the Patent Act was 1,013.

The present fiscal year also shows an increase in the Patent Office revenue. The total amount of fees received was \$218,125.02, being the largest receipts for the same period of time in the history of this branch of the department, the increase over the preceding year amounting to \$10,362.25.

IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT of fees received by the Copyright and Trade Mark Branch from April 1, 1912, to March 31, 1913.

Months.	Trade Marks.	Copyrights.	Designs.	Timber Marks.	Average Price.	Copies.	Total.
1912.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
April.....	3,825 90	153 50	33 00		41 00	23 85	4,080 25
May.....	3,801 75	158 00	50 00	2 00	72 00	24 50	4,108 25
June.....	3,964 40	145 00	40 00		101 00	16 75	4,267 15
July.....	3,937 00	116 65	64 00		35 00	22 75	4,171 40
August.....	2,633 00	130 73	106 00	4 00	433 50	31 25	3,338 48
September...	3,645 15	146 00	63 00	2 00	33 00	26 25	3,915 40
October.....	3,874 58	197 00	80 15	4 00	30 00	25 50	4,216 23
November...	4,891 40	233 20	75 00	4 00	34 00	27 15	5,244 75
December...	3,689 70	258 00	111 00	10 00	89 60	22 35	4,180 65
1913.							
January.....	3,202 20	160 25	64 00		32 00	57 60	3,516 05
February....	4,707 50	146 50	75 00	4 00	48 00	50 75	5,031 75
March.....	4,611 35	204 00	89 00		43 00	35 50	4,982 85
	46,773 93	2,049 43	826 15	30 00	999 50	364 20	51,043 21
Refunds....	7,889 50	25 40	57 00		8 00	1 75	7,981 65
	38,884 43	2,024 03	769 15	30 00	991 50	362 45	43,061 6

The particulars of the registrations made by the Copyright and Trade Mark Branch of the Department of Agriculture during the year ended 31st March, 1912, are as follows:—

I. COPYRIGHTS:—

Full Copyrights without Certificates	1,376
Full Copyrights with Certificates	190
Temporary Copyrights without Certificates	91
Temporary Copyrights with Certificates	5
Interim Copyrights without Certificates	88
Interim Copyrights with Certificates	10
Assignments of Copyrights.. .. .	23
	———1783

II. TRADE MARKS	1,315
Renewals of Specific Trade Marks	70
Assignments of Trade Marks	511

III. INDUSTRIAL DESIGNS	123
Renewals.. .. .	12
Assignments	23

IV. TIMBER MARKS	15
Assignments	2
	———
Total registrations	3,859

The following table shows a comparative statement of the business of this branch from 1903 to 1912, inclusive:—

Year.	Letters Received.	Letters Sent.	Copyrights Registered.	Certificates of Copyrights.	Trade Marks Registered.	Industrial Designs Registered.	Timber Marks Registered.	Assignments Registered.	Fees Received.
1903	2,687	3,211	900	176	557	88	23	272	18,036 25
1904	2,858	3,293	1,106	228	621	107	25	118	20,647 30
1905	3,367	3,902	1,130	189	661	139	22	154	23,706 75
1906	5,340	5,193	1,228	169	1,119	125	47	282	33,107 10
1907	4,475	4,353	1,140	175	848	182	33	136	30,073 20
1908	6,647	4,980	1,416	170	892	162	44	343	37,514 00
1909	6,320	5,750	1,535	171	1,059	143	108	174	38,071 31
1910	6,411	7,688	1,699	206	1,021	118	39	286	42,153 76
1911	7,027	7,091	1,593	213	1,212	149	39	230	46,327 86
1912	9,435	9,322	1,760	205	1,315	128	15	559	51,043 21

V.—PUBLIC HEALTH AND QUARANTINE.

Asiatic Cholera.—During the past year *Asiatic Cholera* has been reported in the following countries:—

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Arabia, Austria-Hungary, Bulgaria, China, Ceylon, Dutch East Indies, India, Indo-China, Italy, Japan, Malta, Montenegro, Persia, Philippine Islands, Roumania, Russia, Servia, Siam, Straits Settlements, Tripoli, Tunis, Turkey in Asia, Turkey in Europe and Zanzibar.

The epidemic of this disease in Italy has been brought under control since my last report. No cases were reported from that country during the past summer except a limited number at Cagliari, Sardinia. The most menacing situation at present is in the war zone in Turkey. Official information concerning the cholera there is meagre or absent; but the belated and imperfect press reports indicate that cases are occurring in large numbers, particularly among the Turkish and Bulgarian troops in the field and fortifications, and also among the refugees in the city of Constantinople.

Bubonic Plague.—This disease has prevailed during the year in the following countries: Afghanistan, Algeria, Arabia, Argentina, Austria-Hungary, Azores, Brazil, British East Africa, Canary Islands, Chili, China, Cuba, Dutch East Indies, Ecuador, Egypt, Germany, Great Britain, Hawaii, India, Indo-China, Japan, Java, Mauritius, Morocco, New Caledonia, Persia, Peru, Philippine Islands, Porto Rico, Russia, Siam, South Africa, Straits Settlements, Turkey in Asia, Venezuela, West Indies.

There was a slight recurrence of Plague in North China in June, several cases of the pneumonic form having been reported during that month. But there has not been this year any repetition of the epidemic outbreak which was so marked last year in both Manchuria and Mongolia. The disease has come nearer to us than usual inasmuch as it has been present at Trinidad, Porto Rico and Havana. All three of these places, however, have been since declared free from Plague in accordance with the International Sanitary Convention.

Smallpox.—This disease has again had an almost world-wide appearance during the year. Two steamships brought cases of this disease to my St. Lawrence Quarantine Station, and three vessels brought cases of it to my Station at William Head, B.C. The last vessel with this disease at the last mentioned Quarantine arrived there yesterday. With regard to the other vessels, the disease was entirely stamped out at my Quarantine Stations.

At my Halifax Station a steamer of the Marine Department was disinfected at the request of the Department. Smallpox was also introduced from St. John, N.B., a case of smallpox to Halifax.

Leprosy.—There are at present in my Lazaretto at Tracadie, N.B., twenty-one patients, eleven males and ten females. Seventeen of these are of French-Canadian, two of English, one of Icelandic, and one of Russian origin.

At my Leper Lazaretto at Darcy Island, B.C., four lepers were received. One of them died there. The other three were deported to China, under the Immigration Regulations.

Beri-Beri.—Experiments and observations during the year seem to confirm the previously formed opinion that this disease is due in many instances to the use of polished rice.

Enteric Fever (Typhoid).—Protective vaccination against Enteric Fever has been steadily advancing in favour among medical men since its first trial on a large scale by the British Army in the Boer war. It has also been used with

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satisfactory results in the French, Russian and Japanese armies, and is said to be completely harmless. The operation is similar to that against smallpox, and produces even less inconvenience.

Tuberculosis.—The most interesting occurrence in connection with this disease has been the claim of Dr. F. F. Friedman, of Berlin, that he has discovered a turtle serum vaccine for the prevention and cure of this disease. The President of the Canadian Association for the Prevention of Tuberculosis invited Dr. Friedmann to come to Ottawa and give an address before the annual meeting of the Association, which he did. He also treated a certain number of patients here. This Association is, of course, not under my Department, but receives a grant from the Federal Government, so that the results of his action in this matter are of a certain amount of interest to us. The question of the value of Dr. Friedmann's treatment is, of course, still *sub judice*, as the results cannot be looked for for some months to come.

Circular Letters were issued from time to time to my different officers, calling their special attention to various matters during the year: On June 9, pneumonic plague in North China; October 2, plague at the Azores; October 7, plague on the Tyne; December 17, routine disinfection from Hong Kong suspended; January 3, 1913, plague rats in Liverpool; January 29, cholera in Constantinople; and March 1, plague in Canary Islands.

Preventive Medicine.—The increasing appreciation of Public Health work is shown by the statement in the Journal of the American Medical Association that the United States spent last year \$2,420,614.95 on strictly public health service, and that the Port Physician of the Port of New York is this year asking for appropriations from his State of \$2,000,000 for the reorganization of the quarantine service of the port, and for an addition of \$35,000 to the pay-roll.

Carriers, human and insect.—Observations along these lines have been continued during the year, and have confirmed previous conclusions, with the addition of the recently reported one, that one of the infectious diseases may be carried by the common biting stable fly.

Pollution of Public Water Supplies.—This matter is deservedly gaining more and more attention every year. International, national, provincial and municipal interest is increasingly shewn in this all-important matter.

Fifteenth International Congress on Hygiene.—This Congress was held in Washington, D.C., in September last. Representatives of twenty-eight nations were in attendance, and the delegates were three thousand in number. President Taft gave an address of welcome at the opening meeting, and in the course of his remarks urged the establishment of a National Bureau of Health. My Director-General of Public Health was sent as a delegate to represent the Government of Canada, and to convey its greetings to the Congress. The compliment was paid to Canada of his being appointed an Honorary President of the Congress.

New Quarantine Station.—In May last I advanced the Port of Digby, N.S., to the position of a regular quarantine station, for the inspection, etc., of vessels entering the Annapolis Basin. Dr. E. DuVernet was appointed as Quarantine Officer in charge.

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New Appointments.—At Grosse Isle in the St. Lawrence I appointed an additional medical assistant, Dr. J. V. Côté, to act as an additional inspector of incoming vessels. Owing to the ever-increasing immigration from Europe, and the occasional arrival at one time of more than one vessel heavily laden with passengers, I judged it necessary to make this additional appointment so as to insure a prompt inspection of incoming vessels.

Crews on boats.—This year the officers and crews of the Quarantine steamers at Grosse Isle had to live on board instead of in houses at various distances from the wharf. This has assisted to insure the most prompt inspection of incoming vessels. The extension of this rule to the Quarantine steamer at other ports is under my consideration.

Mail steamers.—Last year my Quarantine Officer at Rimouski, instead of merely inspecting during the time occupied by the transfer of the mail to the mail tender, came up to Quebec on each mail steamer. This gives him full time for his inspection, and much lessens the delay at Grosse Isle when there is quarantinable disease on board. If, as it is anticipated, there are to be more than one mail steamer a week during the coming season, the increasing of the number of inspectors will require my consideration.

Changes in staff.—During this last year Dr. Lepage has been appointed in place of Dr. Belisle at Rimouski, Que.; Dr. MacLeod in place of Dr. Rindress at North Sydney, C.B.; and Dr. Morrison in place of Dr. O'Neil at Louisburg, N.S.

Protection against rats.—To be ready for the ever possible extension of the plague rats, I have caused two portable sulphur dioxide fumigating appliances to be provided, one to be stationed at Victoria, B.C., and one at Vancouver, B.C. These can be drawn to the end of the piers for the deratization, etc., of vessels it is desired to so treat.

Breasting out, etc., of vessels.—Regulations for the prevention of the possibility of Bubonic Plague getting into this country, by means of plague rats landing from vessels sailing from infected countries, were issued by me in August last, to apply to the various ports of Canada on both oceans. Such regulations had already been in force for some time on the Pacific coast. I was advised by the Department of Justice that as the Department of Marine has charge of harbours, general orders affecting vessels after they have passed quarantine and come into the various harbours, would more naturally fall within the jurisdiction of that Department. Moreover, the regulations in question could be enforced by the harbour masters and other officials of the Marine Department, without such increased expense as would be involved if my Department had to appoint special officers in the various harbours for this purpose. At my request the Department of Marine accepted this obligation, with the arrangement that I should notify them from time to time against which port or ports I advised that it should be enforced. In accordance with this agreement I notified, through my officers, the Department of Marine on the 3rd of January of the finding of plague infected rats at Liverpool, England, and on the following day instructions were issued by that Department to their harbour masters on the Atlantic seaboard.

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These Regulations were as follows:—

1. It shall be unlawful for any vessel coming from any port where Bubonic Plague is present, and entering any port of Canada, to be docked or moored at a less distance from any wharf than six feet.

2. It shall be unlawful for any vessel coming from any port where Bubonic Plague is present, and entering any port in Canada, to be secured or made fast to any wharf by any hawser or hawsers on which there is not placed a metal rat guard or funnel at least three feet in diameter and at least three feet from such wharf.

3. It shall be unlawful for any vessel coming from any port where Bubonic Plague is present, and entering any port in Canada, to be connected with any wharf by a gangway which is not guarded by some person there for the purpose of preventing rats from leaving such vessel by such gangway, and all gangways shall be lifted when not in use.

The whole respectfully submitted,

MARTIN BURRELL,

Minister of Agriculture.

PUBLIC HEALTH.

APPENDIX No. 1.

REPORT OF THE DIRECTOR-GENERAL OF PUBLIC HEALTH

(F. MONTIZAMBERT, I.S.O., M.D.Edin., F.R.S.C.E., D.C.L.).

March 31, 1913.

SIR, I have the honor to submit this report as Director-General of Public Health for the year ending this day.

Asiatic cholera.—Since my last annual report this disease has been reported in the following countries: Arabia, Austria-Hungary, Bulgaria, China, Ceylon, Dutch East Indies, India, Indo-China, Italy, Japan, Malta, Montenegro, Persia, Philippine Islands, Roumania, Russia, Servia, Siam, Straits Settlements, Tripoli, Tunis, Turkey in Asia, Turkey in Europe, and Zanzibar.

The epidemic of this disease in Italy has been brought under control since my last report. No cases were reported from that country during the past summer, except a limited number at Cagliari, Sardinia.

At present the most menacing situation perhaps is the war-zone in Turkey. Official information concerning the cholera is meagre or absent; but the belated and imperfect press reports indicate that cases are occurring in large numbers, particularly among the Turkish and Bulgarian troops in the field and fortifications near Constantinople, and also among the refugees in the city of Constantinople. Some newspaper reports give the number of cases occurring daily as up in the hundreds or even thousands. It is also reported that the troops of the allies contain many victims of the disease. On account of poorly-organized medical and sanitary forces, poor equipment, lack of food supplies, etc., the epidemic may assume tremendous proportions. On account of poor communication and probable suppression of news, the exact conditions cannot be stated.

This disease has been present in many places in Japan, but no large outbreaks have occurred, and public water supplies apparently are not infected. Of interest as showing one of the ways in which this disease is spread is the reported finding of nine cholera bacillus carriers amongst contacts examined in Japan. The totals given for Japan during 1912 were: Cases, 2,722; deaths, 1,678; exclusive of Formosa, in which there were 333 cases, with 256 deaths.

Bubonic plague.—This disease has prevailed during the year in the following countries: Afghanistan, Algeria, Arabia, Argentina, Austria-Hungary, Azores, Brazil, British East Africa, Canary Islands, Chili, China, Cuba, Dutch East Indies, Ecuador, Egypt, Germany, Great Britain, India, Hawaii, Indo-China, Japan, Java, Mauritius, Morocco, New Caledonia, Persia, Peru, Philippine Islands, Porto Rico, Russia, Siam, South Africa, Straits Settlements, Turkey in Asia, Venezuela, West Indies.

Some idea of the ravages committed by this disease in the past may be gathered from the following table published by Dr. Isadore Dyer, of New Orleans:—

- 1334. Black Death destroyed over 25,000,000 persons in Europe.
- 1348. More than 42,000,000 people in the world died of plague.
The disease was endemic in Europe from the 14th to the 19th Century.
- 1720. From Syria to Marseilles the plague killed 80,000.
- 1803. Plague in Constantiople; 150,000 died.
- 1810. Plague in Constantinople; 110,000 died.
- Between 1783 and 1844, 21 epidemics of plague occurred in India.
- 1894. Plague began in Canton—spreading to Hong Kong; 192,000 lives lost.
- 1904. Over a million people died of plague in India, which is now the plague centre of the world.

Since 1896 plague has travelled from Bombay to Australia, Hawaii and Japan—up the western coast of South America and to San Francisco.

There was a slight recurrence of plague in North China in June, several cases of the pneumonic form having been reported on the 8th of that month. But there has not been this year any repetition of the epidemic outbreak which was so marked last year in both Manchuria and Mongolia.

The official report of the Medical Officer of Health for the colony, under date the 24th of August, gives the number of cases to that date as 1,842, and the deaths 1,722. During the week ended February 1, 1913, one fatal case was reported. And three deaths, all Chinese, occurred on the 8th instant.

In Hong-Kong this disease appeared, as has been usual for the last ten years, with the beginning of the summer, and continued until the autumn. The situation was aggravated at first by prolonged drought. Energetic cleansing measures were adopted, the military assisting the local authorities.

A very interesting account of the behaviour of plague germs in marmots during hibernation is given by Drs. Dujardin-Beaumetz and E. Mosny in a note presented to a meeting of the Academy of Sciences of Paris on July 22, 1912. They confirm the belief that there is an ancient and important permanent focus of plague in the Trans-baikal regions and Mongolia. It has been known for some time now that trappers and others who handle marmots or tarbagans (*Arctomys bobac*) in these regions for their fur have been liable to acquire a disease locally known as the *Maladie des tarbagans*, and now Tcherkassoff has demonstrated that this is really plague. If the marmots keep the disease going in the same way as rats and ground squirrels do in other parts of the world, there must be some means of bridging over the Arctic winter. The authors, therefore, tried some experiments on hibernating marmots to see how far they were susceptible to the plague bacilli. They found that the evolution of the germ in such animals was delayed, one of them surviving, for example, for as much as four months under the unfavourable conditions for hibernation which existed in the laboratory. A similar state of affairs has also been noted with regard to tuberculosis and trypanosomiasis. Blanchard and Blatin observed that certain animals very sensible in the waking state to the different pathogenic trypanosomes are, on the contrary, during hibernation absolutely immune. Dujardin-Beaumetz and Mosny think that this persistence of the virus in the marmot through its hibernating period explains the survival of the plague in the endemic foci in Mongolia and the regions of Astrakan.

Porto Rico.—A summary of the plague situation to the end of 1912, including human and rodent cases reported or discovered, was as follows: Human cases, 56; deaths, 36; rats examined, 32,650; rats found infected, 66. The last case of plague in man occurred in San Juan, September 12; the last plague-infected rat was found at Arecibo, October 30, and one at Caguas, December 21, 1912.

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Cuba.—The existence of plague in Habana was first confirmed on July 6, in the case of a Spaniard who had taken sick on June 30. Since that date, two more cases developed, one confirmed July 9, and the other on July 22. The last two cases resulted in death. There were therefore three cases with two deaths known to have occurred between July 6 and September 1, 1912. An investigation made by the Cuban sanitary authorities showed that there had occurred one if not two very suspicious cases, also resulting in death, prior to the first case officially confirmed. All the cases were in persons of one neighbourhood, the first, however, three blocks distant from the last two.

The Cuban health authorities had suspected the possible existence of plague prior to the occurrence of human cases. The official report of the presence of plague in Porto Rico was received by them on June 20, and on the same day an anonymous communication was received from a resident to the effect that an unusual mortality among rats had occurred in an area covering three blocks which were within a square of the Caballeria wharfs. An investigation of this report elicited the information that the mortality among rats had been noticed during the preceding two weeks, and that the unusual mortality had ceased by the time the information reached the sanitary department. Several dead rats were found, but on necropsy were negative as to plague.

The presence of infection can therefore be reasonably dated as early as the first week in June. Between June 24 and July 8, 291 rats were caught within the infected district, and none was found to show plague infection. From July 8 to September 1, 1912, 8,166 rats were necropsied, of which none proved to have plague. Since July 8 a systematic campaign for extermination of rats by a special corps of men, in a zone including the old city of Habana, which allowed a broad margin over the true infected squares, has been in progress. The campaign, of course, was extended to include the wharfs, also Casa Blanca and Regla, which are towns across the bay. The quarantine service also took measures for eradicating rats from lighters and coastwise vessels laying alongside of wharfs.

The campaign, briefly stated, included inspection of houses and the cleaning up in houses of trash and rubbish, disinfection of infected houses, rat proofing of buildings, regulations for the proper storage of foodstuffs, proper disposal of garbage in tight metal containers, as well as the trapping and placing of poisons for rats.

The rapid control of the infection may be attributed to the early discovery and report of the presence of infection, and the active measures taken by the sanitary Department in dealing with the known infected area, as already outlined. Other factors contributing to the successful campaign are that the buildings in Habana are to a great extent rat-proof in structure; also that old sewers where rats usually find refuge did not extend beyond the squares where infection was found.

At the end of the month of August, Cuba was declared free from plague in accordance with the International Sanitary Convention, 1905.

Trinidad.—There were 11 cases of plague with 7 deaths in this island between April 1 and June 13, 1912.

Azores.—Three cases, with 2 deaths, were reported on October 2.

Canary Islands.—Five deaths at Tenerife, February 27, 1913.

River Tyne.—The Local Government Board reported that an imported case of human plague occurred on board a vessel in the river Tyne Port Sanitary District. The patient was an apprentice on board the *S.S. Belleilsa*, which arrived in the river Tyne on September 10.

Liverpool.—A plague-infected rat was found, January 13.

California.—During the week ending September 21, two plague-infected ground squirrels were found in Contra Costa county.

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Hawaii.—The last case of human plague occurred December 16. The last plague-infected rats was found December 28.

Java.—The United States Consul at Batavia has reported to his Government that during the year 1912 there were reported in the Residency of Malang 1,477 cases of plague, with 1,406 deaths. Of this number 743 cases, with 713 deaths, were reported during the last quarter of the year.

Philippine Islands.—During 1912 59 cases were reported, of which 53 died. This year two fatal cases were reported up to the 8th of last month.

During the month of December, in connection with the plague suppressive measures, a very interesting experiment was carried out. On December 17, 1912, a case of human plague occurred at No. 4 Calle Baraca. As soon as the case was removed, and before disinfection, two guinea-pigs, free from fleas, were placed in a wire cage and the cage then placed upon the floor near the place where the patient had slept. On December 21 both guinea-pigs died of typical plague, the diagnosis being bacteriologically confirmed. A similar experiment was carried out in a house on Calle Cabildo, and one on Calle San Fernando, where cases of plague had occurred, but in which immediate disinfection had taken place. In neither of these places did the guinea-pigs contract plague. This experiment would seem to indicate that the disinfecting and insecticide measures which are carried out by the Bureau of Health are effective.

Russia.—Plague continues present in the Astrakan Government. There have been but few cases, however, at any one time, and the total from July 17 to September 17 was 53 cases. At Kherson a plague-infected rat was found on the steamship *Queensmore*, which had arrived from Odessa. The finding of plague-infected rats on vessels in this way is not an uncommon occurrence. It illustrates the manner in which the disease is spread from country to country and from continent to continent by vessels, in the absence of human cases and without there being anything to indicate the presence of the infection on the vessel.

A report from St. Petersburg, dated November 29, states that the commission for the prevention of plague announced October 29 that the northwestern part of Afghanistan was infected with plague and that the frontier between Persia and Afghanistan, from Mean to Meruchak, would be closed.

Shanghai.—The last case of plague at Shanghai was reported November 18, making a total of 16 cases with nine known deaths since the appearance of the disease in November. The cases have all occurred among Chinese, and the area of distribution has remained unchanged. The disease has been evenly distributed as regards sex. Nothing definite is known regarding conditions in the Chinese territory surrounding the international settlement.

India.—Plague has continued to prevail in India. Some idea of its ravages may be gathered from the following published figures: In the Provinces, October 27 to December 28, 25,212 cases, 19,863 deaths; December 29 to February 1, cases, 21,707, deaths, 17,705.

Smallpox.—This disease has again had an almost world-wide appearance during the year. Two steamships brought cases of this disease to your St. Lawrence Quarantine Station, and two further cases occurred in quarantine amongst those landed for observation. These cases would, of course, have developed inland had these persons not been held at quarantine. As it was, the disease in the case of both steamships was stamped out at the Quarantine Station. Three vessels reported this disease at your William Head Station, near Victoria, B.C. The last one arrived there yesterday with a saloon passenger and also one of the Chinese steerage passengers ill with smallpox. They had both come on board at Hong-Kong, so that presumably

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the infection was from one of the ports in Japan. At your Halifax Station a steamer of the Marine Department was disinfected at the request of that Department. The vessel had brought, coastwise from St. John, N.B., a case of smallpox to Halifax.

In several of the States of the United States land quarantine of smallpox cases has been abandoned. The following extract from a Bulletin of the North Carolina Board of Health gives an explanation:

The State has been for many years expending \$50,000 annually enforcing quarantine against smallpox. Whom did this quarantine protect? Not you, who have been vaccinated, but the unvaccinated class, those who, from ignorance or other less pardonable reasons, refuse to be vaccinated. From whom did the State derive the money to pay for this quarantine? From you who have been vaccinated, and, therefore, need no protection. The unvaccinated class in practically all instances is made up of those who do not pay taxes. You see, then, the answer to the query is simple.

Vaccination is an absolute protection against smallpox. If you have been vaccinated you need fear smallpox no more than chickenpox. If everyone were vaccinated smallpox would be wiped off the face of the earth. It is perfectly possible for everyone to be vaccinated. This county, through its County Superintendent of Health, will vaccinate anyone free of charge. Vaccination is practically devoid of danger; a suckling infant may be vaccinated with impunity, and as a matter of fact this is really the best time to vaccinate, as the reaction at this age is comparatively slight.

Taking all these things into consideration, why then should you, who pay the taxes and have been vaccinated, be taxed to protect those from smallpox who pay practically no tax, and who foolishly refuse to be vaccinated? The State has decided that it has no right to thus burden you unnecessarily, and it has, therefore, abolished quarantine against smallpox. It is anticipated that by doing this, not only will the taxpayers of the State be relieved of the cost of the quarantine, but also more individuals will be vaccinated. This means an earlier and more complete eradication of the disease and that, therefore, the incidence of smallpox will be considerably decreased.

When a case of smallpox occurs now in any community in this State, it is the duty of the County Superintendent of Health to put a placard on the house in which the case is confined, and to notify the public of the existence of the case and its location. It is then 'up to' the unvaccinated individuals in the community to take their choice between vaccination and protection from the disease, or remaining unvaccinated and rendering themselves liable to infection.

It will be of interest to quote here Sir William Osler's challenge to the anti-vaccinationists: 'A great deal of literature has been distributed casting discredit upon the value of vaccination in the prevention of smallpox. I do not see how anyone who has gone through epidemics as I have, or who is familiar with the history of the subject, and who has any capacity left for clear judgment, can doubt its value. Some months ago I was twitted by the editor of the *Journal of the Anti-Vaccination League* for 'a curious silence' on this subject. I would like to issue a Mount Carmel-like challenge to any ten unvaccinated priests of Baal. I will go into the next severe epidemic with ten selected vaccinated persons and ten selected unvaccinated persons—I should prefer to choose the latter—three members of parliament, three anti-vaccination doctors, if they could be found, and four anti-vaccination propagandists. And I will make this promise—neither to jeer nor jibe when they catch the disease, but to look after them as brothers, and for the four or five who are certain to die I will try to arrange the funerals with all the pomp and ceremony of an anti-vaccination demonstration.'

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In the course of a recent address before the Medical Society of King's College Hospital, London, Mr. Stephen Paget, F.R.C.S., spoke as follows:—

Another subject on which we must speak with authority is vaccination. Let alone the sound ethical argument, that a man must not leave undone what is good for the general safety of the community; our authority rests not on ethics but on facts. Concede to the anti-vaccinationist that in times happily past it is unhappily true that a few cases of syphilis did occur from arm-to-arm vaccination; they were not one in fifty thousand—still, they did occur. Assure him that neither syphilis nor tubercle can be transmitted in glycerinated calf-lymph. Then arm yourselves with half a dozen authoritative facts. Get these facts in a handy form from Dr. Bond, of Gloucester, who is the Honorary Secretary of the Jenner Society; get them now, before you forget; and keep them by you, till you want them. Have in your minds the history of the Gloucester epidemic of 1895-96; how, in the Gloucester Cemetery, are the bodies of 279 unvaccinated children who died in that epidemic, and only one vaccinated child. Have in your minds, also, the complete immunity of well-vaccinated doctors and nurses attending cases of the disease. But do not take your facts from this country alone; for here in England we have strict sanitary laws, and vigilant medical officers of health; besides, in England there is not enough smallpox left for an appeal to overwhelming statistics. Therefore, take your facts from virgin soil; take them rather from the East than from the West. Here, for instance, is a good weapon, lately forged against the enemies of vaccination. In May of this year the doctors in Philadelphia gave a banquet to the President of the United States; and after dinner he made them a speech, saying what great things they had accomplished in Havana, in Panama, and elsewhere, against yellow fever, malaria, dysentery, typhoid, and other scourging diseases; and he went on to speak of America's latest possession, the Philippine Islands. And these are his words: 'By a whole-vaccination of all of the inhabitants of the Philippines, carried out carefully and rigorously, we have practically stamped out smallpox of all kinds in the islands, in which the black smallpox of the most virulent type flourished before our coming.' Surely, these words of the President of the United States are more worth having than a whole shelf of anti-vaccination tracts. Or look at the vast accumulated experience of India: there is no more overwhelming proof to be desired of the innumerable hosts of men, women and children safeguarded by vaccination from the horrors of smallpox.

Leprosy.—There are at present in your Lazaretto at Tracadie, N.B., twenty-one patients, eleven males and ten females. Seventeen of these are of French-Canadian, two of English, one of Icelandic, and one of Russian origin.

No deaths, and no admissions occurred during the year. One man was so restored to health that he was discharged in November last. He and another patient similarly discharged a year ago, have been found upon the periodical visits to them of the medical officer of the Lazaretto to remain free of the disease. They had both been treated with Nastin, Chaulmoogra oil and strychnine. Whether they may be claimed as cures, or whether they are cases of what sometimes occurs, limitation of, or the production of auto-immunity against the disease, it will take more cases to determine.

Your Leper Lazaretto at Darcy Island, B.C., was used during this year for accommodation of four Chinese lepers while awaiting deportation under the Immigration Regulations. The death of one of these men occurred at Darcy Island, the other three cases were deported to China. They were given the address of the Leper Mission Hospital at Canton, and given money enough to pay for their stay there for some months.

The following notes on leprosy in Hawaii are from the pen of George W. McCoy, Surgeon, United States Public Health Service:—

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There are few subjects of a public health nature about which more general misinformation exists than that of the care of lepers in Hawaii. For example, the impression is very general that the lepers in Hawaii are kept isolated on a barren, desolate island far out in the ocean, and that the place is patrolled by armed guards; indeed, so general is the understanding that guards are required that the local officials receive several letters each month from persons in the United States and elsewhere making inquiries as to vacancies in the force of guards at the Molokai leper settlement.

The facts are that the leper settlement occupies a small peninsula of nine square miles jutting out from the northern side of the island of Molokai and forming not more than one-fortieth of the whole area of the island—an island that is excelled by few in beautiful scenery and natural attractiveness. There are no guards, armed or otherwise, and none are needed, as the majority of the lepers are well satisfied to remain in the settlement, where ample provision is made for all physical needs, and the necessity for labour does not exist. Any who might escape would be apprehended and returned by the police authorities on the island. A remarkable fact in this connection is that when, as occasionally happens, a leper recovers and is authorized to leave the settlement, a request to be permitted to remain is frequently made.

The history of leprosy in the Hawaiian Islands goes back only about 60 years, at which time it seems probable that it was introduced by Chinese immigrants. For this reason the disease is known among the natives as *Mai pake* (Chinese disease). The first official notice of leprosy was taken in 1864, when the board of health took measures to isolate those who were afflicted. Since that time the policy of segregation has been carried on with varying degrees of vigor. Probably on the whole the various laws for dealing with those afflicted with this malady have been enforced in about the same degree as sanitary laws are enforced on the mainland.

At the present time there are about 700 known lepers in the islands. About 600 of these are at the leper settlement on Molokai and 100 at the isolation hospital at Honolulu. The number who are at large must be considerable, as every year many are collected who are in such an advanced stage of the disease that it is impossible to believe that they could have developed in one year the lesions that are found when they are brought in for examination.

The total number of lepers is much below what it was a few years ago. The decrease is largely brought about by the fact that the native Hawaiians, the race in which the disease is most prevalent, are rapidly becoming reduced in number, there being now only about 36,000 among a total population of 192,000. About 2 per cent of the Hawaiians have leprosy.

Rabinowitsch has recently claimed to have made a somewhat startling discovery in regard to the bacteriology of leprosy which appears to show that our modern knowledge of the heredity of the disease may require revision. The author studied more especially the blood of miscellaneous lepers and fetuses, making use of Uhlenhuth's antiformin method. The finds in patient's blood were not constant and it was necessary to make repeated examinations as a rule. Positive results were obtained in six lepers and one fetus. These appear to show that the bacilli may pass from the maternal blood directly into the fetal circulation, and that it is possible for the child to inherit the disease, although as in the case of tuberculosis this mode of transmission may be rare.

The evidence in favour of regarding goats as a source of leprosy in man has lately been collected by Dr. P. Engelbreth, who holds that leprosy is not transmitted from man to man. The strict isolation of lepers in ancient days and in the Middle Ages, he asserts, did not cause an appreciable reduction of the disease. It spread rapidly, and, though isolation was maintained with equal strictness in England,

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Central and Southern Europe, the disease disappeared only in the two former areas. Further, it does not increase in such countries as Egypt, where isolation is not enforced, while it appears in places where it has previously been unknown. Out of 512 marriages, of which records were obtained, leprosy subsequently developed in the healthy mate of a leper in 17 cases only. The presumptive evidence of the existence of an intermediate host is therefore strong, and for the following reasons Dr. Engelbreth suspects the goat of acting this part. Leprosy is a disease of mountainous countries where the goat is bred. In ancient times Egypt, Arabia, Asia Minor, and India were centres of leprosy and goat breeding. Both goats and leprosy were imported from Asia Minor into Greece, whence they were simultaneously transmitted to Italy and Spain. In the time of Charlemagne, goats were far more numerous than cattle and sheep; but in the sixteenth and seventeenth centuries, goats were largely ousted by sheep, whose wool rose in value. As goats became scarce, leprosy began to disappear. This coincidence was, he says, most striking in Denmark, where, about the year 1400, flocks of 50 to 200 goats were kept on every farm, and where there were twenty leper hospitals. Owing to their ravages on the woods goats were expelled in 1473 from Fyen by Christian I. In 1541 a war of extermination was waged against them throughout the country, and fourteen years later, Christian III. was able to abolish all the leper hospitals, and Dr. Engelbreth estimates that fourteen years was the average term of a leper's life. Norway, however, has kept both her goats and her lepers, and in 1843 there were over 2,000 lepers and about 500,000 goats. Now, the tale of goats has been halved, and that of the lepers has been reduced to 200. All the countries in which leprosy still exists are also goat-breeding countries; and in America, where leprosy was unknown before Columbus, the distribution of leprosy corresponds with the prevalence of goats. The parts colonized by the Spaniards, the Portuguese and negroes have both goats and lepers; while the northern states, which were colonized by the English, possess neither. In a paper published by Hertha in 1912, two forms of tuberculous disease in the goat have been described. The one is identical with bovine tuberculosis; the other is totally different, and is characterized by greyish-yellow, firm, but not caseous, nodules in the internal organs. These nodules closely resemble those found in the internal organs of lepers. Whether the infection is carried from goat to man by the finger-nails of the person who tends the infected goat, or by the milk, Dr. Engelbreth does not pretend to decide; but he thinks that much may depend on the extent of the disease in the goat, and on the opportunities for contact with man. He suggests that lepers may again transmit their disease to goats, and, if this be so, the isolation of the former may yet be of use. But he attaches more importance to a campaign against infected goats by diagnostic injections of tuberculin, which causes a re-action in lepers as well as in the tuberculous. He further suggests that a tuberculin prepared from infected goats should be given to the surviving lepers, whose numbers he computes at 300,000, as he believes that in this way a speedy extinction of leprosy would be brought about.

Upon reading this article in the *British Medical Journal* of 1st February last, I drew the attention of Dr. Langis, your Medical Superintendent at the Tracadie Lazaretto to this question, and asked him to report on this matter, as far as those sections of New Brunswick are concerned which furnish, and have for so long furnished, from time to time our leper patients for the Lazaretto; and to let me know whether there is any reason, in his judgment, to think that this observer is correct as far as New Brunswick is concerned. Dr. Langis has replied as follows: 'As far as these sections of New Brunswick are concerned which furnish from time to time our patients for the Lazaretto, I have no hesitation in saying that the goat theory as a source of leprosy is not tenable; for there are no goats to be seen here, and never have been.'

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Dr. Chreighton Wellman, of New Orleans, has this year published accounts of some of his experiments in the treatment of leprosy by salvarsan. His conclusions are:

1. In cases where the patient is not too weakened from the disease, salvarsan may be administered without harm.
2. Some improvement may be expected, especially in early cases.
3. We have no evidence that such effect of the drug is in any way specific or permanent.
4. 'Arsenic has long been employed in leprosy,' to quote from our preliminary note on this subject, 'and we have no evidence that salvarsan is superior in its action to the other forms of arsenic which have been used by previous observers.'

Beri-beri.—In the December, 1912, number of the *Journal of Hygiene*, E. A. Cooper, B.Sc., from the Lister Institute of Preventive Medicine, writes in part as follows:

The historical aspect of beri-beri has recently been so exhaustively dealt with by Schaumann (1910), Simpson and Edie (1911), and Funk (1912), that it is only necessary to consider here in detail the previous investigations of the protective and curative effects of various food-stuffs and their extracts towards this disease and the analogous polyneuritis of birds.

The evidence obtained by Eijkman (1897) and Braddon conclusively proved that beri-beri occurred amongst those races that used a highly polished (steam-milled) rice as their staple diet, but not amongst those peoples whose diet consisted of rice decorticated by hand or parboiled rice.

Fletcher (1907) by the application of this discovery found that beri-beri disappeared from amongst the inmates of an asylum subsequently to the replacement of polished rice by whole rice as the staple diet.

Again we read in the *Journal of the American Medical Association*, Jan. 25, 1913: 'Gouzien has been studying the records in regard to beri-beri in the penitentiary at Hanoi in French China from 1906 to 1910. He concludes that rice undoubtedly plays a very important part in the pathogenesis of the disease, but that the superiority of the unhulled to the polished rice does not lie in any antitoxic effect of the hulls but in the fact that they protect the grain against degeneration from heat and moisture. He considers the disease an intoxication, not an infection, and cites in support of this theory the fact that a very severe epidemic of beri-beri was followed by an epidemic of scurvy, the latter disease attacking only those who had been affected by the former. The two diseases seem to be in a sense interchangeable. Moreover, even when polished rice of the same quality is used, marked decrease is noted in the epidemic when the diet is varied by a free use of fresh vegetables, fruits and meat. In addition to the dietetic factors, overcrowding and dampness seem to play an important part in the course and severity of the disease. Gouzien is at the head of the medical department of the French army in Tonquin, and his article is published in the *Annales d'Hygiène et de Médecine Coloniales*, 1912, xv, 3.'

Yet Carl Lovelace, M.D., of Porto Velho, Brazil, claims (*Journal American Medical Association*, Dec. 14, 1912) that rice is not a factor in the causation of this disease. He says that amongst the 30,420 admissions to the hospital of the Madeira-Mamoré railway between Jan. 1, 1908, and Jan. 1, 1912, the diagnosis of beri-beri or of 'poly-neuritis' or of 'multiple neuritis' was made 963 times. He says: My second proposition is that this affection as it occurs in Brazil is not etiologically related to a diet of polished rice. To resist this negation requires some temerity on the part of a mere clinician, after reading the papers of Fraser and Stanton,⁹ and many references to the work of Chamberlain and Vedder,¹⁰ Heiser and others in the

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Philippines. I do it because I have seen some patients with beri-beri whose diet was varied and abundant—who had not eaten a grain of rice for many months before the onset of the disease; a large number of patients with beri-beri, who, enjoying a liberal, protein-abounding diet, had eaten it only occasionally throughout their lives, and a great number of sufferers from the disease, in whose diet it could not be considered the staple article. Of the latter class I have seen a goodly number who for months before the onset of the disease had had rice excluded from their diet.

Unlike the Oriental, the South American, by nativity or adoption, is a meat-eater. He eats the European breakfast, but he eats two full meals every day and partakes liberally of meat at both. Beans, which are supposed to have a therapeutic value in the treatment of beri-beri in the East, are staple articles of diet throughout North Brazil. They abound on the tables of the poorer classes. *Feijoada*, a compound of bacon, red beans and dried beef, lightly touched with garlic and bathed in its own gravy, is the dish universal among the poor, and not despised by the wealthy. The bean with meat is the staple article of food of the Brazilian peasant. Rice and *farinha* (cassava) and bananas are side dishes. It must be admitted that the Brazilian labourer eats some rice practically every day, and that the incidence of beri-beri is perhaps highest in his class; but the same line of reasoning would incriminate polished rice as a casual factor in lobar pneumonia, malaria, uncinariasis and gonorrhea. Among our Brazilian employees lobar pneumonia is twenty times more frequent, relatively, than it is among our American employees.

In December, 1909, alarmed at the increase of beri-beri among our employees of all classes, we caused rice to be eliminated from all company messes and removed from all the commissaries. In lieu of rice we furnished macaroni. The staple food-stuffs of the labourers were made to consist of dry biscuit, meat (dried and tinned meat and codfish), beans and macaroni instead of dry biscuit, meat, beans and rice. Conditions along the line of work were such that a large majority of the labourers were deprived of rice. The men who boarded at the company's messes ate no rice at all. The beri-beri rate climbed steadily throughout the year 1910, and dropped abruptly at the end of the year exactly as it had done in 1909. In 1910 on a comparatively rice-free diet, there was relatively three times as much beri-beri amongst our employees as there was in 1911, during which year all the messes and all the commissaries of the compound served and sold rice freely. The rice has always been the same kind—white, polished rice.

One of our American physicians, who did not eat a grain of rice while in Brazil and who purposely refrained from eating it because of its supposed association with beri-beri, contracted the disease after about ten months' service here and was invalided home. Three other members of our staff, who lived at headquarters and who ate rice only occasionally, certainly not more than once a week, were invalided home with the diagnosis in both cases of beri-beri. One of these men ate at the table of the chief engineer, the other two lived at this hospital. At neither table did rice appear except occasionally. Two other physicians stationed in the camps contracted the disease and were invalided home. Because one of these physicians had malarial parasites in his blood, when he got home, his affection was there diagnosed as 'malarial neuritis.' In all, six physicians have contracted the disease here—six healthy, young adults who lived on a full protein-rich diet.

The incidence of the disease among physicians has been greater than among any other class except the Brazilian labourers. Does not this fact alone speak volumes?

In 1910, out of a total of 690 admissions to the first-class ward of this hospital, there were twenty-four cases of beri-beri. Many of these patients came here and were invalided back to the United States during the time that rice was prohibited.

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They did not eat a grain of rice. They were clerks, mechanics, camp foremen, time-keepers, etc. Their diet here would not have suffered, in comparison, as to quality, quantity and variety, with the diet of persons similarly employed anywhere in the United States. Fresh meat, onions, potatoes and an abundant supply of the best American tinned meats, fruits and vegetables were supplied in lavish profusion, in addition to the bacon and beans which have belted the globe with steel rails. Among the men from whom these cases were drawn (and no account is taken of a number of contract-expired men, who left of their own accord when the disease first manifested itself) the food supply was above criticism from any standpoint.

In a paper read before the annual meeting of the American Society of Tropical Medicine, in June last, Dr. R. H. Creel, U.S. Public Health Service, writes:

Summarizing the prevalence of beri-beri, it is seen that the disease is confined chiefly to those people that mainly subsist on rice. The Moluccas, where the allied diet of sago obtains, is an exception.

The origin of beri-beri is not recorded, but the great increase of cases has been coincident with the increased production of steam milled rice, and is proportionate in different localities to the amount of polished rice consumed.

In the Philippines and other parts of the Orient, beri-beri outside of Government controlled institutions, has been on marked increase during the past decade.

The mortality in Manila from beri-beri during the last eight years has been double that from cholera, and has exceeded that from any other disease. Beri-beri in the United States has not shown any great prevalence and is not a matter of concern to us from a public health standpoint.

If the diet of the Oriental be liberally increased or made equivalent to a Western standard there would no longer be a beri-beri problem.

The prevention of beri-beri is all very easy on paper, but the practical application of prophylaxis is quite a different matter, when we consider the small sanitary force at work among a people that are not at all overly keen in co-operation with alien advisers or administrators.

Enteric fever.—Protective vaccination against typhoid has been steadily advancing in favour among medical men since its first trial on a large scale by the British army in the Boer war. It has also been used with satisfactory results in the French, Russian and Japanese armies, and is said to be completely harmless. The operation is similar to that against smallpox, but produces even less inconvenience. Because of its results in the French army, anti-typhoid vaccination as a compulsory public measure is being advocated in France, where 6,000 deaths from the disease occur annually.

In 1911 compulsory vaccination against typhoid fever was ordered for the United States army, consisting of about 76,000 men. Nearly a year ago the navy authorities adopted a similar policy. Recently Surgeon General Stokes of the navy stated that not a case of the disease had occurred among the 64,000 enlisted men of the navy in the eleven months since vaccination. Army reports show similar immunity; of the 16,000 men mobilized in Texas in 1911 because of the troubles in Mexico, only one contracted typhoid during three months of camp life. In the Spanish-American war, with no such vaccination, 20,738 cases of typhoid developed and more than 80 per cent of the total mortality was due to the disease.

Major F. F. Russell, Medical Corps, U.S. Army, has written as follows:

It is now little more than three years since we, in the army, began our present campaign against typhoid fever, using antityphoid vaccine with the idea of immunizing each individual soldier.

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That the ordinary means of prevention are not available for the protection of the health of soldiers in the field is well known. To furnish troops in camp and on the march with unpolluted water and suitable food has been, and still continues to be, a problem for field sanitarians, but the difficulties to be overcome are so great that success has rarely attended their efforts.

The experience of our troops in the war of 1898 is still fresh in our minds. It will be remembered that among 120,000 men we had 20,730 cases and 1,580 deaths, or about one case of typhoid to every five men. During the Boer war the English army had 31,000 cases and 5,877 deaths. During the Franco-Prussian war there were 73,396 cases and 8,789 deaths among the German troops alone; in fact, 60 per cent of their total mortality was due to typhoid fever. The records of the Civil War show that there were over 80,000 cases in the Northern army.

In the country at large we know that the disease is altogether too prevalent; in 1910, in the registration area of the United States, which comprises only 58 per cent of the total population, there were 12,673 deaths from typhoid fever, or 23.5 per 100,000 population.

From these figures it is evident that there is no more important problem for military surgeons than the prevention of typhoid fever, consequently we have attacked the disease from all sides. Every effort is made to supply pure water and uncontaminated, wholesome food. Improved methods of camp sanitation have lessened the difficulties due to flies and the lack of sewerage system. Nevertheless, we know that in time of war this system of sanitary safeguards would break down and typhoid fever again become the formidable antagonist it has been in the past. For this reason we began, as I have stated, to vaccinate each and every individual against typhoid as well as against smallpox, the two vaccinations being carried out simultaneously, one on either arm.

Bacterial vaccines against typhoid were first used by Pfeiffer and Koll in Germany (*Deut. Med. Wochenschr.*, 1897, 735), and by Sir A. E. Wright in England (*Lancet*, Lond., September 19, 807, and *Brit. Med. Jour.*, January 30, 1897, 16). The changes in the blood serum after vaccination were studied first by Pfeiffer and Koll and afterwards by Wright, so far as was possible with the laboratory methods in use at that time, and the same immune bodies were found in the serum after vaccination with killed typhoid bacilli as were found after an attack of typhoid fever.

In the early days there was a tendency to consider that this immunity lasted little more than a year, since agglutinins disappear from the blood serum at about this time, yet we know that these antibodies are present as long after vaccination as after typhoid fever itself, which confers, usually, protection for life. We are not, therefore, justified in concluding that the immunity ceases with the disappearance of the agglutinins and other antibodies. It remains to be seen if the immunity lasts as long as that conferred by vaccinia.

We also know that the immunity is not absolute, for in 1911, among about 80,000 persons vaccinated, there were twelve cases of typhoid, with one death due to hemorrhage, and in 1910, among 15,000 vaccinated there were six cases with no deaths. The diagnosis of typhoid was made purely on clinical grounds in many of these cases, and it is indeed perfectly possible, almost probable, that some were paratyphoid fever. During the past year we have seen an increasing number of cases and it may be more common than appears from our returns.

In India, Colonel Firth (*Jour. Roy. Army Med. Corps*, 1912, XIX., 157) reports 104 cases of paratyphoid fever in 170 cases of typhoid during the year 1911, all based on accurate bacteriological diagnosis, by means of blood cultures. This point is of considerable importance, as antityphoid vaccine does not protect in the least against paratyphoid fever.

The fact that the immunity is not absolute is, however, no objection to its use, but rather an argument for its repetition at intervals to be determined in the future as the lessons of experience become clear, just as we now do in the case of smallpox. The failure, in some cases, to secure absolute immunity may be due to inefficient vaccine, to exceptionally large quantities of infectious material, or to inability of the individual to respond to immunization with the usual antibodies, and this failure may be interpreted as a personal idiosyncrasy. With the limited number of doses of vaccine now used, we can never hope to raise the immunity high enough to protect against overwhelming doses of infectious material, and there are, no doubt, certain persons who cannot be completely protected against typhoid any more than against smallpox.

In the future no army should be ordered into the field, in a region where enteric fever is endemic, unless every individual of the command has been immunized against the disease. It is the only method of prophylaxis which protects the soldier against the ever-present bacillus carrier, and the only kind of protection which is effective under all conditions.

Its use during epidemics is another important field.

Still another group of importance consists of children and college students who are at the most susceptible age. In addition they are exposed more than adults because of the greater use of unheated milk and long summer vacations in the country. Children and young people bear the immunization particularly well and it is advisable to vaccinate them before they leave home for the summer vacation or college. There is no more objection to revaccinating against typhoid than against smallpox.

Dr. Russell, after experience with 359 cases of antityphoid inoculation in the United States, gives his opinion that the inoculation as a preventive measure is both necessary and highly desirable for children and young adults, especially when leaving home for summer vacations, schools and colleges. In the cases studied no harmful effects are reported, none have contracted typhoid fever, and both the local and general reaction are less marked than in adults. The dosage is based on weight and not on age. Revaccination should be undertaken earlier than in adults. The importance of this subject may be judged from the statistics of the U.S. Bureau of the Census, which show that in 1909 there were 3,366 deaths from typhoid in the registration area in patients under twenty years of age. Of this number 1,192 deaths occurred in patients under ten years of age. A very large proportion of these could undoubtedly be prevented by the use of the vaccine.

Tuberculosis.—The turtle serum vaccine for tuberculosis introduced by Dr. F. F. Friedmann, and described by him in a paper published in the *Berliner klinische Wochenschrift* of November 18, of which an account was given in the *British Medical Journal* of December 7, 1912, is being introduced in the United States, where Dr. Friedmann now is. We are informed that his colleague, Dr. Piorkowski is at present in London. We learn from the *New York Medical Journal* of March 29 that the following statement has been made by the United States Public Health Service regarding its investigation of the Friedmann treatment for tuberculosis. On March 8 the Secretary of the Treasury, on the recommendation of the Surgeon-General, caused a board of medical officers to be detailed to make a thorough investigation of Dr. Friedmann's alleged cure for tuberculosis. These officers proceeded immediately to New York, and arranged with Dr. Friedmann for demonstrations of his remedy upon persons suffering from tuberculosis. These demonstrations are being carried on in certain New York hospitals through the courtesy of their respective authorities, and will be continued until sufficient information has been obtained for the forming of an opinion as to the merits of the treatment. Dr. Friedman has method of treatment. In addition to the observation of persons under treatment by submitted to the board a culture of the bacteria which, he states, are used in his

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Dr. Friedmann, the board of officers will make experiments to ascertain whether this culture is, as Dr. Friedmann asserts, harmless to warm-blooded animals. Considerable time will necessarily be required to carry out these investigations, and in the meantime the public is advised that tuberculosis patients should not travel long distances in the hope of receiving the treatment. Those to whom it is administered for demonstration purposes are selected by the hospital authorities from among their patients, the number selected constituting only a small proportion of available volunteers. Certain statements purporting to be expressions of the opinion of the board of officers of the public health service carrying on the investigations have appeared in the newspapers. These officers have expressed no opinion, and will not be in a position to do so until the work has advanced sufficiently far to warrant some conclusion in regard to Dr. Friedmann's treatment.

In the *Medical Record* of the 22nd inst., Dr. Karl Von Ruck writes in part: In the light, however, of the fact that many other creditable observers have noted the recurrence of virulence with like cultures it remains for Friedmann to show that his particular culture is permanently avirulent for the human subject, which he has, of course, not done, and which he is unable to do without resorting to the human experiment supported by autopsy. The best of avirulence for the guinea pig, while suggestive, is not conclusive and would not be, even if by passages through this or other animals, he had shown these to be resistant.

The ordinary duration of the life of a guinea pig is not long enough to show what might occur in the human subject, knowing as we do that an infection acquired in early childhood may not become manifest until in later periods of adult life.

We know that tubercle bacilli can continue, in a living state, in the tissues of animals without apparent pathogenic power for years, and we have ample evidence that this can be likewise the case in the human subject as shown by so-called latent infections, which after many years may become active and progressive. We must in the light of such observations conclude that though avirulent for long periods of time, the bacilli gradually adapt themselves to their host and acquire pathogenic power. To such a change the organism may itself contribute by metabolic changes in its own tissues, favoured by intercurrent diseases, by trauma, or by nutritive disturbances, or the bacilli may acquire virulence by successive subculturing in the organism itself, *in situ* or after transport from a tissue highly resistant, to one that is less so.

It may, however, be presumed that Dr. Friedmann was in possession of ample and conclusive evidence to contradict at least most of the objections stated and others which might be suggested, before he inoculated several hundred infants and young children with his living bacilli, and that for their successful protection he will supply in due time, other proof than the statement that 'although some of them had been vaccinated a year before he made his communication, none gave evidence of scrofula.' Valid evidence is the more necessary because none of the animals which he sought to protect with his living bacilli, resisted an infection with a but slightly virulent culture of tubercle bacilli, judging the degree of virulence by the length of time necessary to cause death of his control animals.

Another writer in the same paper says:

The notoriety given by the public press in this country to the claims made by Dr. Friedmann, of Berlin, before the Berlin Medical Society on November 6 last, interests the writer more particularly on account of Dr. Friedmann's statement that he has vaccinated 360 children within the last year with a vaccine consisting of living tubercle bacilli, that had been found non-virulent by laboratory experiments. The *Berliner klinische Wochenschrift* of November 18 contains Friedmann's paper in full and also the discussion which followed its presentation. In the latter, several of those participating made it clear that, with the evidence at hand, the use of a

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living virus, which for the time had lost its virulence for laboratory animals, was not justified and implied serious risks. Citron called attention to the experience of Pasteur, with a presumably non-virulent living virus of chicken-cholera which though first apparently successful, for some unknown reason regained its virulence later, and instead of protecting, caused veritable epidemics in the fowls which had been injected for the purpose of their protection.

It appears to me that even with the risk of using a living virus, Dr. Friedmann has not supplied the slightest evidence that he has conferred any degree of resistance or of immunity on the children which he inoculated. The only evidence which he sets forth for this purpose, namely that these children are 'so far free from scrofula' can scarcely be called evidence of immunity, nor does it preclude the possibility of his having actually infected them, since an intra-muscular injection of tubercle bacilli does not necessarily produce clinical evidence of tuberculosis in the time which has intervened, and need not do until many years later.

The *Journal of the American Medical Association* says in regard to this matter:

In another place in this issue of *The Journal*, and in the Berlin Letter of last week's issue, reference is made to Friedmann's treatment of tuberculosis. This method of treatment does not appear to be based on any new principle. It represents simply another effort to utilize for curative and preventive purposes the antigenic substances in the tubercle bacillus, without the simultaneous introduction of any toxic or harmful substances. In order to secure this effect, living bacilli, devoid of virulence and invasiveness, so it is asserted, are injected intra-muscularly. These bacilli are said to be derived from the turtle, but the method by which they are deprived of virulence is withheld. This secrecy is not in accord with the ethical standard of scientific medicine. The report as to the results of the practical use of this carefully guarded secret shows, first, that in the experiments on guinea-pigs complete protection has not been obtained. Indeed, it is doubtful whether the protection obtained is any greater than that obtained by the injection of killed bacilli. Furthermore, there are no indications that it has been possible to cure tuberculous guinea-pigs by means of the bacilli rendered avirulent by a secret method. The treatment consequently lacks an unassailable experimental basis—a really and promptly effective cure for tuberculosis is expected to cure tuberculosis in guinea-pigs and other animals. The injections so far made by Friedmann in children seem to indicate that the bacilli as injected are harmless in children, and that is all. We have no evidence that the injections will prevent tuberculosis in children, and from the nature of the case it will be exceedingly difficult to determine what the effect of such injections really is. In the second place the alleged curative effects do not seem to be any more pronounced and definite than those obtained with the various forms of tuberculin when properly used. The remarks made in the discussion following the reading of Friedmann's paper before the Berlin Medical Society clearly substantiate this statement. Finally we come to the possible dangers of the treatment, to which Citron refers, namely, reversion to virulence on the part of the bacilli. This possibly must be reckoned with and constitutes a serious detriment to the method, no matter what its real virtue may be, if it has any. Its apparent harmlessness in children so far is counterbalanced by this possible danger. In view of these considerations there is not sufficient warrant for any other attitude toward Friedmann's treatment of tuberculosis than one of critical neutrality and judicious skepticism; for it concerns an essentially secret procedure without adequate experimental basis and without any better results to its credit than produced by tuberculin properly used.

Those who think that sometimes physicians are prone to be too sceptical and lacking in readiness to look with favour on new therapeutic announcements should

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have recalled to them a little medical history, which shows clearly how few of the vaunted new cures prove successful. There is scarcely a month that passes in which there is not some announcement of a novel remedy or mode of treatment for some disease or other. It is not too much to say that ninety-nine out of every one hundred of them either fail completely or else prove eventually to be of very minor significance as curative agents.

Hence the medical and professional attitude toward new cures in general and particularly those announced for our chronic and most frequent diseases. It is no spirit of jealousy that dictates the scepticism, but, on the contrary, the very proper desire to safeguard the public from the injury that inevitably comes when a remedy proves to be a failure.

For even when the remedy is perfectly harmless in itself the excitement and above all the disappointment prove harmful to patients. There is no doubt now, however, that Dr. Friedmann's new cure will be properly tested and every possible benefit that it may be to incipient consumptives accurately estimated. It will be a question of months, however, not weeks, for the decision to be reached, and in the meantime the less that the great body of sufferers from tuberculosis are disturbed over the new remedy the better.

The Canadian Association for the Prevention of Tuberculosis invited Dr. Friedmann to come from New York and to deliver an address at the annual meeting of the association. This he did. He subsequently treated some patients at the Water Street Hospital. With regard to this the association appointed a committee of five medical members of its executive committee to watch the progress of the cases and to report upon them. Our position in the matter is 'We do not endorse or recommend Dr. Friedmann's treatment, nor can we be sure that it is entirely safe, but we are willing to observe patients who take it upon their own responsibility, and to report the results impartially.'

It cannot be long before the true value of the treatment will be clearly ascertained. Then, and not until then, will the world know whether it is a discovery worth untold millions or merely one of the numerous false beacons which have raised the hopes of millions of sufferers only to dash them to deeper despair.

Circulars.—Circular letters were issued from time to time to your different officers, calling their attention to the various matters during the year. On June 9, pneumonic plague in North China; October 2, plague at the Azores; October 7, plague on the Tyne; December 17, routine disinfection from Hong-Kong suspended; January 13, 1913, plague rats in Liverpool; January 29, cholera in Constantinople; and March 1, plague in the Canary islands.

Bulletins, &c., received.—The weekly Public Health Reports of the United States Public Health Service have been regularly received and are of great value, as are also the monthly bulletin from provincial, state, and municipal boards of health in Canada, the United States and other countries. The bulletins of the International Office of Public Health, Paris, and of the Sleeping Sickness Bureau, London, have been regularly received throughout the year and in both cases spare copies received have been distributed to the provincial boards of health.

Preventive Medicine.—M. J. Rosenau, Professor of Preventive Medicine and Hygiene, Harvard University, very aptly writes: One reason why prevention has not made faster progress is because it lacks dramatic interest. When we prevent disease—nothing happens! There is nothing very exciting about that. To cure a disease or to stamp out an epidemic fills the eye and appeals to the imagination. A brave general or a gallant admiral is the object of universal admiration, but where is the monument to those who have prevented war? Again, if disease is prevented, there is always a lurking suspicion that perhaps it would not have occurred anyway. This skepticism, which is born of ignorance, is one of the most powerful brakes upon the chariot of progress.

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The results of cure are positive—the results of prevention seem negative. Cure is real, active, evident; prevention seems mysterious, quiet, uncertain. For instance, the fact that the effects of prevention are not plain enough for every one to see is one of the obstacles against which vaccination has always had to contend. If Jenner had discovered a cure for smallpox instead of a preventative, and if that cure had been half as effective as vaccination, every civilized nation in the world would do him homage.

The increasing appreciation of public health work, however, is shown by the statement in the journal of the American Medical Association, that the United States spent last year \$2,420,614.95 on strictly public health service, and that the port physician of the port of New York is this year asking for appropriations from his state of \$2,000,000 for the reorganization of the quarantine service of the port, and for an addition of \$35,000 to the pay roll.

Carriers, Human.—An article on this subject in a bulletin of the Ohio State Board of Health reads in part as follows:—

Investigation along epidemiological and bacteriological lines tends more and more to disprove the old theories of transmission of acute contagious and infectious disease by fomites. The theory of 'the prolonged sojourn of specific micro-organism in inanimate nature can no longer be considered valid.' As these sources of infection assume their position lower and lower in the scale of important disseminators of disease, only the human carrier is left. Aside from this negative evidence bacteriology furnishes concrete proof of the importance of the human host. The transitory, the precocious and the chronic carrier are everyday assuming greater importance, not only as so many foci from which infection is spread, but also as a means of conserving the seed, and so bridging over the quiescent period from one outbreak to a later epidemic.

The precocious carrier is one who harbours the specific etiological agent of a disease, but who has not as yet shown symptoms of the disease. The transitory carrier is one who has had the disease, and who, after the stage of acute symptoms has passed, still carries the virus or bacterium for a variable time. Least common, but a great source of danger, is the chronic carrier, who for long periods after convalescence is established, harbours the specific organism, now distributing them broadcast, and now showing no bacteria in any of his secretions, to later become an active carrier again. A fourth class might be added,—comprised of those who distribute the specific organisms only during the course of their illness. It is true that this is not generally considered with the carrier class, but in the true sense of the word its members are carriers, and are responsible for many more cases of disease than all the other classes combined.

If, then, we recognize in the human carrier the all important agency for the spread of disease, our problem, while not made easy, is yet simpler to grasp, and if its importance is realized an enormous amount of time and money will be saved. It is not argued that fomites, or inanimate objects in intimate association with the patient, may not spread disease; the contention is that this method of transmission is very unimportant as compared with the human carrier.

Carriers, Insect.—The *Journal*, November 16, 1912, says on this subject:—

Scarcely second in causative importance to bacteria, the primary agents in infectious diseases, are parasites and other insects, the active and often indispensable mediums in the spread of such diseases. This phase of epidemiology has not been exhaustively studied, and it is possible that scarcely more than a beginning has been made in determining what insects may act as carriers. Mention need hardly be made of the two species of mosquito, the house-fly, the flea, the tick, &c., as well-known carriers. M. F. Gales states that on shipboard roaches, to which hitherto little attention has been paid as carriers of disease, are responsible for the continuance and

spread of typhoid, diphtheria, tonsilitis and tuberculosis. He does not state this as a result of experimental demonstration, but as a conclusion arrived at through experience in epidemics in the navy. If this is possible on board ship it is no less possible in the congested quarters of cities, tenements, rooming-houses and especially hospitals. Gales reports pulverized sodium fluorid used as an insect-powder as the most satisfactory method thus far tried by the navy for ridding the ships of roaches. W. M. Kerr seems to have found evidence which incriminates the bedbug as a carrying agent in leprosy and sustains the opinion that it is responsible for the transmission of that disease in a large number of cases. In a series of experiments in which numbers of different insects were allowed to feed on the infected areas of leprosy patients and were afterwards examined, the flies, fleas and mosquitoes were found to contain very few acid-fast bacilli, but these were found in considerable numbers in a large percentage of the bedbugs. No acid-fast bacilli were found in control insects, which were examined in large numbers. The difficulty of cultivating the lepra bacillus and the inexpediency of experiments on human subjects make further experimental evidence difficult to obtain.

The experiments of M. J. Rosenau, recently reported before the International Congress on Hygiene and Demography, indicate that anterior poliomyelitis may be carried by the common biting or blood-sucking stable-fly. Previous experiments have seemed to demonstrate that the disease is also communicable by the secretions of the nasal mucous membranes and digestive tract. Rosenau's demonstration consisted in allowing flies which had fed about the faces of infected monkeys to bite healthy monkeys. The resulting infection of the latter with anterior poliomyelitis seems to prove that these flies are capable of acting as carriers, and the latter experiments of Anderson and Frost, to which reference was made in our editorial November 2, apparently confirm Rosenau's work.

Communities must perforce depend largely on medical men and boards of health for proposing and directing measures looking to the prevention of the spread of disease by carriers. Therefore medical men and boards of health are under obligation to know not only what agents may act as carriers, but also what means may be of service in exterminating the pests.

Aerial and Contact Infection.—In a paper read before the International Congress of the Hygiene and Demography, held at Washington last September, Dr. Charles V. Chapin, summarized as follows the views not generally accepted, and the diminished belief in the essential importance of infection by means of contaminated air. Formerly it was thought that yellow fever, influenza, cholera, scarlet fever, typhoid fever, smallpox, diphtheria, and tuberculosis were all air-borne diseases. Experiments establishing the insect origin of yellow fever and malaria have proven that at least these two diseases are not in the air-borne group. There is no good evidence of the air carriage of typhoid fever or cholera and the rapid diffusion of influenza can be explained by the ubiquity of carriers. Observations around hospitals and dwellings show that diphtheria and scarlet fever are not carried by the outer air and the consensus of opinion of the bacteriologists is that tuberculosis is probably not transmitted in this way. The view of certain English observers that smallpox may be carried long distances through the medium of air alone has not stood the test of careful analysis. The existence of carriers and mixed cases affords such ample opportunity for infection by contact that the theory of aerial transmission is no longer required to explain the origin of hitherto unexplainable cases of contagious diseases. However, it is theoretically possible that the contaminated air of houses and hospital wards may transfer the disease from one part of the infected building to another, although the virus may be too diluted in the outer air to do any harm. But even in the case of indoor infection the evidence for air transmission is not strong. The bubonic type of plague, Mediterranean fever, cerebrospinal meningitis, and poliomyelitis do not spread in

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hospital wards. When hospital infection occurs in cholera and typhoid fever it can invariably be traced to a contact infection. Typhus fever is transferred by insects, and the experience of Mexico and England with this disease shows that infection by air does not occur in hospital. By a study of conditions in Providence, Chapin found that scarlet fever and diphtheria are not air-borne from family to family in the same dwelling. An identical opinion has been reached by independent observers in other parts of the United States as well as in France and England. Finally it would seem that it has been definitely proven that air is practically a negligible factor in the transmission of all the contagious diseases except measles, whooping cough, smallpox, chickenpox, and rubella. In regard to these, opinion is still divided.

The Pollution of Public Water Supplies.—At a meeting of the Great Lakes International Pure Water Association, held at Cleveland, Ohio, recently, a special committee previously appointed, of which Mr. George C. Whipple, consulting engineer of New York city was chairman, made a report, which was adopted by the association.

The following extract from that report shows some of the conclusions of the committee:

‘The committee finds that on account of the increasing population of the country, it is and always will be physically impossible to maintain waterways in their original and natural condition of purity. A reasonable degree of cleanliness should nevertheless be demanded.

‘The discharge of raw sewage into streams and harbours should not be universally prohibited by law. The method of disposal of sewage by dilution is recognized as sound in principle and safe in practice if carried on with proper restrictions.

‘For each waterway at any given point there is a limit to the amount of permissible discharge of waste matter, depending upon the use made of the river and the character of the territory through which it flows. No universal standard of purity can be wisely established or maintained. When the extent of the pollution is such as to affect the public health in any way by any reasonable use of the river, the sanitary aspect of the situation should control and the degree of pollution should be regulated accordingly. The courts must decide what is reasonable use. When the extent of the pollution is such as to cause sensible offence to public decency in the course of any reasonable use of the river, this aspect of the situation may properly control. When the extent of pollution is such as to cause material injury to fish or shell fish industries, or to the ice industry, this element may control. When the extent of pollution is such as to cause the silting up of the channels of navigable streams, this element may control.

‘Even when the demands of public health, offense to decency and interference with navigation are such as to place a limit to the pollution of the stream, the economic aspects of the case should be considered in regulating the amount of permissible discharge of waste matter, the fundamental principle being that the results accomplished shall be reasonably commensurate with the cost of prevention of the pollution.

‘While no universal standard of purity applicable to all rivers and waterways can be established, it is believed to be feasible to establish and maintain appropriate standards of a general nature for waters that fall within certain particular groupings. The committee has this matter under advisement, but is not prepared to report upon it in detail at this time.

‘Inasmuch as the safety of public water supplies is the most important element in the problem of stream pollution at the present time, the following general principles should govern the discharge of sewage and waste matters into rivers and waterways:

‘Streams from which water supplies are taken without purification should not receive any fecal matter, sewage, sewage effluent or wastes that will render the water a menace to health or otherwise impair its natural quality.

'Streams from which water supplies are taken and used after purification should not receive fecal matter, sewage, sewage effluent or waste matters in such quantities that the contamination of the water at any waterworks intake would put an unreasonable burden upon the purification works, or in quantities sufficient to produce the conditions referred to in the next paragraph.

'Streams not used for water supply may receive sewage wherever and in such quantities that its entrance will not sensibly offend decency in the reasonable public use of the stream or cause interference with navigation or with valuable fish industries or the ice industry. Where this cannot be done, the sewage or waste should receive such treatment before discharge as to bring the effluent within this rule, due regard being given to the relative cost of the processes required and the benefits to be derived.

'Large lakes from which water is used for public water supply after filtration should not receive any fecal matter, sewage or sewage effluent within a distance of several miles from the intake, depending upon local conditions as to currents, and suitable provision should be made for disinfecting the water supply.

'Large lakes from which water is used for public water supply after filtration should not receive fecal matter, sewage, sewage effluent or other waste matters in such amounts or at such places that the water reaching the intake would be contaminated to the extent that an unreasonable load would be placed upon the filter, or in quantities sufficient to produce the condition referred to in the next paragraph.

'Lakes not used for water supply, harbours and tidal estuaries, may receive sewage if discharged in such a manner as to be quickly and thoroughly diluted, so that its entrance will not sensibly offend decency in the reasonable use of the water, or interfere with navigation. Where this cannot be done, sewage should receive such treatment before discharge as to bring the effluent within this rule, due regard being given to the relative cost of the processes required and the benefits to be derived. The data for deciding what is a reasonable burden to place upon a water filtration plant have not yet been secured. It is recognized that water filtration plants are not infallible, and that for this reason the work that they are called upon to do must not be too great. Until this fundamental question is settled, it will not be possible to formulate reasonable standards of purity for streams necessarily used both for sewage disposal and water supply. Often greater economy can be secured by abandoning water supplies from polluted streams than by attempting to reduce the pollution to the required extent.

'While recognizing that the pollution of many rivers and waterways is inevitable and that absolute prevention of pollution is impossible, it is deemed imperatively necessary that some control over the discharge of waste matter into rivers and waterways be maintained. The committee heartily endorses, therefore, the movement that is being made to keep the pollution of streams within reasonable bounds.

'The committee recommends the adoption by the association of these fundamental propositions, believing that they will serve as a basis for the establishment of more detailed standards later and will be helpful to those who at the present time are engaged in formulating policies in regard to this matter. The committee also requests that it be allowed to continue its work for another year.'

Human Hair.—*The Medical Press and Circular* writes as follows: Traffic in human hair is growing extensively since fashion imposes the wearing of chichis on our fair sisters. China is the great exporter of hair, and the best market is New York, whither 282 tons were sent last year, representing £150,000. But Vienna, London, and especially Paris are not much behind.

The hair from China does not come from the dead, as was often feared, but almost exclusively from hair falling during the toilette of the Celestials, collected with care by hair dressers and servants.

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For many years the hair was exported in the 'raw' state—that is to say, with no other treatment than the disinfection imposed by the sanitary service. But recently several manufactories have sprung up, one of which employs no less than 600 hands. Here the hair is combed and washed in a bath containing soda, black soap and ammonia; after drying in a current of hot air, the hair is plunged for twenty-four hours into a vat of boiling water. It is finally sterilized in an autoclave, and then receives the colour desired, there is very little use for black hair.

The aeration of the hair during these processes, and the subsequent boiling and sterilization, may be taken to remove all danger of the introduction of disease into the country by the importation of this hair.

Carbon Monoxide disinfection.—An extremely efficient apparatus has been recently put upon the market to draw the carbon monoxide and carbon dioxide from the funnels of steamers for fumigating purposes. These gases were first passed through scrapers to get rid of the soot, and were lethal to the rats. But they did not kill the flea, and it was no use in haying any gas which did not kill the fleas. That only added to the risk, for once the rats were dead the fleas sought the nearest living creature in order to obtain nutriment.

Carbon Monoxide disinfection.—An extremely efficient apparatus has been recently put upon the market to draw the carbon monoxide and carbon dioxide from holds, when there was a rush of gas through bulkheads into the men's quarters, and the smell of the gas induced the men to escape. If carbon monoxide had been used the men would not have recognized it, but would have been overcome, and have lost their lives.

Food and Drugs Act and License.—The Journal of the American Medical Association in a recent editorial on this subject, has in part as follows:

This country is being flooded—and it is the same abroad, but to a less extent—with preparations belonging to the general class of 'vaccines, viruses, antitoxins,' &c. As many of these bear the label 'Licensed by the Treasury Department' or 'U.S. Government License No. —' and, for the most part, 'Guaranteed under the Food and Drugs Act' in addition, it may be well to remind our readers of the exact meaning of these phrases. The guaranty under the Food and Drugs Act has no meaning at all for the consumer; it simply means that in case of legal difficulty the retail dealer may shift the responsibility to the manufacturer. The most brazen humbugs are 'guaranteed' in this way; this phrase has led to much misunderstanding and has undoubtedly greatly increased the confidence, even of intelligent persons, in nostrums.

The 'License of the Treasury Department' has a different significance, although it too, is capable of abuse and is being abused. Perhaps the situation will be more intelligible if we review briefly what the license means and what it does not mean.

Several years ago Congress passed a law to regulate the interstate traffic in viruses, serums, &c., the enforcement of which was placed in the hands of the Public Health and Marine-Hospital Service. Under the terms of this act and the regulations for its enforcement all manufacturers, both here and abroad, who desire to manufacture such products for interstate traffic are required to procure a license from the Treasury Department. This license is granted only on the recommendation of the Surgeon General of the Public Health Service for a period of one year, and only after a thorough inspection of the establishment and examinations of the products themselves. No license can be granted to an establishment which does not have sanitary stables, a properly equipped laboratory and a competent personnel; the establishments are subject to inspection at any time and are required by law to be

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inspected at least once a year. The license may be revoked on evidence that the establishment is not being properly conducted; as a matter of fact, the licenses of some of the best-known establishments both here and abroad have been revoked or suspended pending improvements.

The examinations in the Hygienic Laboratory of the Public Health Service of products found on the market as well as those obtained directly from the firms are directed to detecting the presence of living organisms, especially of pathogenic organisms, the presence of tetanus toxin, the control of the strength of the preparations, so far as this is possible, the absence of adulterations, etc. An illustration of the working of the law is the statement from the last annual report of the Public Health Service that, owing to the difficulty of exercising a satisfactory control over foreign establishments manufacturing vaccine virus, the importation of the latter into the United States is now prohibited. This report also cites the fact that experts from the Hygienic Laboratory investigated certain cases of tetanus alleged to have resulted from the use of vaccine virus; the allegations were found to be baseless.

The Hygienic Laboratory, after prolonged investigations, has established official American standards for diphtheria and tetanus antitoxins; all such preparations sold in the United States are required to conform to these standards. Before the establishment of these standards the antitoxins on the American market were extremely variable; in many cases they were worthless. The control of vaccine virus is similarly efficient; before the passage of the law much of the vaccine virus on the market contained large numbers of living bacteria and 'sore arms' were common. As the result of this work the United States probably leads the world in the quality of diphtheria and tetanus antitoxins and vaccine virus.

It is obviously desirable that the Hygienic Laboratory should extend its investigations and prepare standards for other products to which all firms can be held. This is simply a question of an enlarged laboratory and more money.

The XVth International Congress on Hygiene was held in Washington, D.C., September 23-28, 1912. I had the honour to be present as a delegate of the Canadian Government, and to convey their greetings to the Congress at the public inaugural meeting. Representatives of twenty-eight nations were in attendance, and the delegates were stated to be 3,000 in number. President Taft gave an address of welcome at the opening meeting, and in the course of his remarks urged the establishment of a National Bureau of Health. He said in part:—

'We need to develop under governmental auspices a bureau or a department, in which the funds of the government shall be expended for research of every kind useful in the practice and enforcement of hygiene and preventive medicine.

'That something of this sort may grow out of the present United States Public Health Service there is reason to believe,' continued the President, 'but it will need far greater appropriations and a widening of its scope of duties before it shall have filled the place that the medical professions of this country has a right to expect the general government to create in the progress of hygiene and demography.'

The Congress was organized in two divisions, a division of Hygiene, with eight sections, a division of Demography, constituting a ninth section. The sections are as follows:

1. Hygienic Microbiology and Parasitology; under the presidency of Prof. Theobald Smith, M.D., Harvard Medical School, Boston.
2. Dietetic Hygiene; Hygienic Physiology; under the presidency of Prof. Russell Chittenden, Sheffield Scientific School, Yale University, New Haven.
3. Hygiene of Infancy and Childhood; School Hygiene; under the presidency of Dr. A. Jacobi, Emeritus Professor of Pediatrics, College of Physicians and Surgeons, New York City

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4. Industrial and Occupational Hygiene; under the presidency of Dr. Geo. M. Kober, Professor of Hygiene, Georgetown University, Washington.

5. Control of Infectious Diseases; under the presidency of Dr. Hermann M. Biggs, General Medical Officer, Department of Health, New York City.

6. State and Municipal Hygiene; under the presidency of Dr. Frank F. Westbrook, Professor of Pathology and Bacteriology, University of Minnesota, Minneapolis.

7. Hygiene of Traffic and Transportation; under the presidency of Surgeon-General Rupere Blue, United States Public Health Service, Washington.

8. Military, Naval and Tropical Hygiene; under the presidency of Medical Director Henry G. Beyer, United States Navy, Washington.

9. Demography; under the presidency of Prof. Walter F. Willecox, Professor of Economics and Statistics, Cornell University, Ithaca.

Many valuable papers and discussions formed part of the proceedings.

The honour was paid to Canada of my being appointed an Honorary President of the Congress.

New Quarantine Station.—In May last you advanced the Port of Digby, N.S., to the position of a full regular Quarantine Station for the inspection, etc., of vessels entering the Annapolis Basin, with Dr. E. DuVernet as the Quarantine Officer in charge.

Additional Inspector at Grosse Isle.—Owing to the ever increasing immigration from Europe, and the occasional arrival at one time of more than one vessel heavily loaded with passengers, you judged it necessary to appoint another assistant medical officer at the Grosse Isle station to assist in the inspection of incoming vessels. Dr. Joseph V. Coté, of Cap St. Ignace was therefore appointed by you, and came on duty with the opening of the St. Lawrence season of navigation in April last.

Crews on boats.—At Grosse Isle, in the St. Lawrence, this season the officers and crews of the quarantine steamers have had to live on board instead of in houses at various distances from the wharf. This has ensured the most prompt inspection of in-coming vessels. The extension of this rule to the quarantine steamers at other ports is under your consideration.

Mail Steamers.—This season your quarantine officer at Rimouski, instead of merely inspecting during the time occupied by the transfer of the mail to the mail tender has come up to Quebec on each mail steamer. This gives him full time for his inspection, and much lessens the delay at Grosse Isle when there is quarantinable disease on board. Dr. Lepage is the officer in charge of this service. If, as it is intimated, there are to be more than one mail steamer a week during the coming season, the question of increasing the number of inspectors will deserve your consideration.

Changes in staff.—During the last year Dr. Lepage has been appointed in place of Dr. Belisle, at Rimouski, Que.; Dr. McLeod, in place of Dr. Rindress, at Sydney, N.S.; and Dr. Morrison in place of Dr. O'Neil, at Louisburg, N.S.

Notification Inland.—A recommendation I deem of great importance would be the re-adoption of the immigration destination-notification system. This measure provided that, when immigrants arrive at our ports from infected places, or on vessels on which disease has occurred, the health officers at the places of destination should be sent notification cards informing them that immigrants from such-and-such places arriving on such-and-such ships are *en route* to their cities. In this way the local health officers may have oversight of immigrants from infected ports during, at least, the incubation period.

These notices should be sent from the port of arrival to the different provincial Boards of health, and by them communicated to the local health officers interested.

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Sulphur Dioxide Fumigators.—To be ready for the ever possible extension of the threatening of Bubonic Plague involving the expediency of the sulphur dioxide fumigation of vessels from the Orient, or from United States ports, portable sulphur dioxide fumigators on wheels have been provided at Victoria, B.C., and Vancouver, B.C. These can be drawn to the end of the piers for the deratisation, &c., of vessels it is desired to so treat.

Breasting out, &c., of Vessels.—The following regulations, for the prevention of the possibility of bubonic plague getting into this country by means of rats which come from vessels sailing from infected countries, were approved by you in August last to the various ports of Canada, on both oceans. These regulations had already been in force for some time on the Pacific coast.

1. It shall be unlawful for any vessel coming from any port where bubonic plague is present and entering any port of Canada, to be docked or moored at a less distance from any wharf than six feet.

2. It shall be unlawful for any vessel coming from any port where bubonic plague is present, and entering any port in Canada, to be secured or made fast to any wharf by any hawser or hawsers on which there is not placed a metal rat guard or funnel at least three feet in diameter and at least three feet from such wharf.

3. It shall be unlawful for any vessel coming from any port where bubonic plague is present, and entering any port in Canada, to be connected with any wharf by a gangway which is not guarded by some person there for the purpose of preventing rats from leaving such vessel by such gangway, and all gangways shall be lifted when not in use.

We have been advised by the Department of Justice that as the Department of Marine has charge of harbours generally, orders affecting vessels after they have passed quarantine and come into the various harbours would more naturally fall within the jurisdiction of that department. Moreover the regulations in question could be enforced by the Harbour Master and other officials of the Marine Department without such increased expense as would be involved if this department had to appoint special officers in the various harbours for this purpose.

On your request the Department of Marine accepted this obligation, with the arrangement that we should notify them from time to time against which port or ports we advised it be enforced.

In accordance with this agreement I notified the Department of Marine on the 3rd January, 1913, of the finding of plague-infected rats at Liverpool, England, and on the following day instructions were issued by that department to their harbour masters on the Atlantic seaboard.

Official visits, inspection, &c.—On May 9, last, I visited, by your instruction, the Royal Alexandra Hospital for Contagious Diseases at Montreal. By permission of the Department of Public Works I was accompanied by Mr. Wright, their assistant chief architect. The object of our visit was in connection with the preparation of plans for the new hospital to be erected at the Grosse Isle Quarantine Station.

On May 19 I left for Toronto and attended the annual meeting of the Canadian Association for the Prevention of Tuberculosis.

On June 14 I left for the Atlantic coast, and inspected the leper lazaretto at Tracadie, N.B., and the quarantine stations of Chatham and St. John, N.B., Digby, Halifax, Sydney and Louisburg, N.S., Charlottetown, P.E.I., and Grosse Isle, Que., in the river St. Lawrence. Whilst in the Maritime provinces I had interviews with the secretary of the Provincial Board of Health of New Brunswick at Fredericton, and with the secretary of the Provincial Board of Health of Nova Scotia, at Middleton. I was accompanied as far as Halifax by Dr. Tremayne, your quarantine officer at Prince Rupert, B.C., who had been detailed by you to come east to study quarantine work at the Atlantic quarantine stations. On my return journey I stopped over at Rimouski to explain his duties to your new officer there, Dr. Lepage.

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On August 4, I left for the west. I attended the annual meeting of the Canadian Medical Association at Edmonton, Alta., and then proceeded to the Pacific coast where I inspected at Vancouver, Victoria, William Head and Prince Rupert. On this trip I conferred with the provincial health officers of Manitoba, Saskatchewan, Alberta and British Columbia at their respective capital cities.

On September 15 I went to Toronto and attended the annual meeting of the Canadian Public Health Association, September 16-17. Thence I went to Washington, D.C., for the annual meeting of the American Public Health Association, September 19-21, and the XVth International Congress on Hygiene and Demography, September 23-28.

On October 23 I went to St. John, N.B., to superintend the installation of disinfecting appliances under the arrangement of inspecting service; and visited the Halifax, N.S., and Grosse Isle, Que., stations before returning.

On December 15 I went to Buffalo, N.Y., and was present at a meeting of the International Joint Commission *re* Boundary Waters.

Stations, &c., Grosse Isle, Que.—Vessels inspected, 384, an increase of 17 over last season; persons inspected, 210,677, an increase of 17,364 over last season; admissions to hospital, 947. The diseases were smallpox, scarlet fever, diphtheria, measles, rotheln, chicken-pox, mumps, dysentery and enteric fever. There were 13 deaths in hospital, from measles, 3; diphtheria, 1; scarlet fever, 2; mixed infection, scarlet fever and diphtheria, 3; broncho-pneumonia, 1; broncho-pneumonia, complicating diphtheria, 1; meningitis, complicating scarlet fever, 1; inanition, 1.

Smallpox was brought by two steamships, and two further cases occurred amongst those landed for observation. The disease was, in regard to both vessels, stamped out at quarantine.

Diphtheria was unusually prevalent amongst the young immigrants this year.

The year has been a busy one, especially at the hospital, where sometimes as many as 300 were under treatment at the same time.

Inoculations with serum was used 357 times; 459 bacteriological examinations were made, as well as many analyses in the laboratory.

The vaccinations exceeded 3,500.

The inspection service was improved in promptness and efficacy by the appointment of Dr. Joseph V. Côté, of St. Ignace, Que., as additional medical assistant to help in the boarding and clearing of in-coming vessels, and by your regulation, new this season, that the crews of the quarantine steamers must live on board, so as to be always on the spot, ready for immediate duty at the first call.

The improvements commenced last season were the new saloon passenger detention building, a laboratory, dwellings for medical assistants and for nurses, and an extension to the western wharf. These works are not yet quite complete, but it may be expected that they will be finished early this season.

The most pressing wants at this station are a new and enlarged hospital, a T at the end of the western wharf, and the replacement of the old third-class detention sheds by modern buildings.

Rimouski, Que., advance station of Grosse Isle, vessels inspected, 29. Dr. Lepage is now your officer there, and you enlarged his duties to include coming up on the mail steamer and inspecting her between Rimouski and Grosse Isle. This reduces delay at Grosse Isle when there is sickness on board.

Halifax, N.S.—Vessels inspected, 386; persons inspected, 157,499. Admissions to hospital, 115; diseases: measles, scarlet fever, and chicken pox.

Improvements made during this year have been a residence for the engineer, the disinfecting buildings, the old hospital, and the steward's residence and outhouses were repaired, and the disinfecting buildings and old hospital painted. The roadway recently constructed connecting the wharf and the disinfecting buildings with

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the hospital is also a marked improvement. The saloon passenger detention building, the steerage detention building, the two small observation hospitals, the ambulance building and the tank require painting after repair. An icehouse is much required to keep perishable provisions fresh.

During the year four steamers were fumigated for rats. In some of these as many as 400 rats were killed.

One coastwise steamer was treated for the Marine Department for smallpox. The vessel was fumigated, the crew vaccinated and bathed, and their effects disinfected.

Captain Pye was appointed by you as Captain of the Quarantine Steamer *Minoca* from 1st January, 1913.

During the year we lost by death John O'Neil one of the crew of the *Minoca*, a capable employee.

St. John, N.B.—Vessels inspected, 149; persons inspected, 37,911. Admissions to hospitals, 32. Diseases: measles, meningitis, enteric fever, pneumonia, and mumps. Deaths, two; one from broncho-pneumonia, and one from marasmus. A laboratory, and residences for the bacteriologist, boatman and assistant caretaker are in course of construction. Some general repairs to roofs and to plumbing have been carried out. A new telephone cable has been laid. The water pipe gave out early last autumn. Since then the Station has had to depend upon water brought down from the city by tug, and pumped up to the buildings. The new ambulance has been of great service.

With regard to the requirements of this Station, its Medical Superintendent reports: 'Our most pressing need is a wharf out to low water, and a government-owned boat. A wharf where our boat can lay with her crew on board, so as to be obtainable at all times. Many times as it is now it is impossible to get aboard the quarantine tug on account of the big seas running, and at low water often impossible. Several times this winter we have had to leave the patients on board the ship from one to two days before we were able to land them. Before we will ever be able to board vessels and bring the sick off safely and humanely, the wharf and boat I speak of will have to be furnished.'

Digby, N.S.—This Station was made a regular one by you this year for the quarantine handling of vessels coming in through Digby Gut to Digby and other ports of the Annapolis Basin. Dr. DuVernet reports that during the 10½ months since his appointment 11 vessels have been inspected. No quarantinable disease was found.

Sydney, N.S.—Vessels inspected, 112; no quarantinable disease.

Louisburg, N.S.—Vessels inspected, 40. No disease.

Chatham, N.B.—Vessels inspected, 44; persons inspected, 1,058. No quarantinable disease.

Charlottetown, P.E.I.—Vessels inspected, 4. No inspection of vessels from the neighbouring province has been required during the year.

William Head, B.C.—Vessels inspected, 162; persons inspected, 36,318. Three vessels were quarantined on account of smallpox. The last came in yesterday with one case amongst the saloon passengers and one amongst the steerage.

The diseases reported at the Station were smallpox, diphtheria, chickenpox, mumps, enteric fever, and beri-beri.

Two vessels had had cases of plague on board, and two vessels had had cases of cholera on board between Hong Kong or Shanghai and Japanese ports.

The saloon passenger detention building is being bettered by addition of new bath rooms and closets, laundry, quarters for stewards in attendance, and the installation of hot water heating for the main building.

General repairs and some improvements have also been carried out.

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Victoria, B.C.—No vessels required inspection at this port during the year.

Vancouver, B.C.—Vessels inspected, 1. No quarantinable disease.

Portable sulphur dioxide disinfecting appliances have been provided for the ports of Victoria and Vancouver as referred to before in my report.

Prince Rupert, B.C.—No quarantinable disease. The new wharf at the station is practically complete.

Tracadie Leper Lazaretto, N.B.—Patients at present, 21: 11 males and 10 females. Seventeen are of French Canadian, two of English, one of Icelandic and one of Russian origin. No deaths and no fresh admissions during the year. Treatment with Nastin and Chanlmoogra oil is being further tested.

D'Arcy Island Leper Lazaretto, B.C.—Four Chinese lepers were admitted during the year, one died at D'Arcy Island. The other three were deported to China under the immigration regulations.

Public Works Health Act.—Your inspector for eastern Canada under this Act, Mr. Charles A. L. Fisher states that the year has been again an exceptional one in the almost non-appearance of contagious and infectious diseases among the men on the works coming under his inspection, except 8 cases of enteric fever in some of the camp hospitals.

He reports that he has found the medical service given to be complete, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions in that way reported previously.

Your inspector for western Canada, Dr. A. E. Clendenan, reports that the volume of work has greatly increased during the last three years with more than ever in prospect for the next twelve months. He reports that with few exceptions, the medical service has been up to the requirements of the Act, and bona fide complaints are few. Camp sites have been nearly always wisely chosen, with a view to drainage and water supply, as well as convenience to the work.

The general health conditions have been exceptionally good.

On all work there were 17,046 employed at the time of inspections.

I have the honour to be, sir,

Your obedient servant,

F. MONTIZAMBERT, M.D.,
Director-General of Public Health.

The Honourable
The Minister of Agriculture,
Ottawa.

APPENDIX No. 2.

(G. E. MARTINEAU, M.D.)

GROSSE ISLE, QUE., March 31, 1913.

SIR,—I have the honour to submit this my annual report to March 31, 1913, as medical superintendent of the Grosse Isle Quarantine Station.

During the season there were 384 vessels inspected and cleared, being an increase of 17 over last season. Of these only two were sailing vessels.

Two hundred and twenty-one of these vessels were passenger boats which class comprised 58 per cent of the total.

There were inspected of all classes of passengers and crews 205,549 persons, being an increase of 12,235 over last year, and about 10,000 over any previous year.

They were divided among the various classes as follows:—

Cabin..	6,292
Intermediate..	45,127
Steerage	107,597
Cattlemen	165
Crew..	51,437
Stowaways..	59

Infectious or contagious diseases were reported or discovered on vessels arriving at Quarantine on 108 occasions, as compared with 102 last season.

The diseases so reported or discovered were: variola, scarlet fever, diphtheria, measles, rothelm, varicella, mumps, enteric fever and dysentry.

On one occasion a steamer arrived at quarantine with a very suspicious case of cholera on board.

Variola was discovered on two occasions, May 26, on the ss. *Tunisian*; and on June 26, on the ss. *Pretorian*.

Every passenger steamer coming up the St. Lawrence landed infectious diseases at quarantine on one or more occasions.

Deaths during the voyage were reported on 22 occasions due to the following causes: Lost overboard, 3; heart disease, 4; suicide, 2; epilepsy, 1; pñeumonia, 5; cardiac failure, 1; nephritis, 1; gastritis, 1; broncho-pneumonia, 2; acute indigestion, 1; convulsions, 1.

Births during the voyage were reported on 10 occasions.

Twice, steamers arrived with passengers who refused to be vaccinated; they were landed for usual period of detention.

Over 700 people have been landed at healthy division for necessary period of observation; but a good many of these have been detained as long as 39 days, owing to new cases breaking out after landing.

One of the female passengers on ss. *Tunisian*, gave birth to a child while detained for observation.

Vaccination exceeded 3,500.

Suspicious case of Cholera.—SS. *Pretorian*, Capt. Hamilton, sailing from Glasgow on July 12 with 57 intermediate, 96 steerage passengers and 121 crew, arrived at quarantine on July 22, with on board a member of the crew ill with symptoms resembling those of Asiatic cholera. The history of that case prior to its arrival at

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quarantine was the following; Patient had been taken ill on July 18 with diarrhoea, vomiting; and this had lasted for the four days then elapsed. When first seen at quarantine, he was collapsed, had a weak rapid pulse and showed pale cheeks and blue lips with subnormal temperature. This case was looking so suspicious that, under the circumstances, we found it more prudent to satisfy ourselves with a bacteriological examination of the patient's stools. The results having been negative, the vessel was immediately released after a detention of 12 hours for such bacteriological examination. This case was simply gastro-enteritis, and having fully recovered, was discharged, from the hospital on July 27.

Smallpox.—S.S. *Tunisian*, Capt. Rennie, sailing from Liverpool on May 17 with 49 cabin, 330 intermediate, 1,059 steerage passengers and 277 crew, arrived at quarantine on May 26. On making the inspection of steerage passengers we discovered a case of smallpox which was immediately transferred to quarantine hospital. All exposed passengers (538) and crew (32) have been landed for a quarantine of observation, and compartments on board occupied by these thoroughly disinfected. Everybody on board was also vaccinated as usual and the vessel released and permitted to proceed after a detention of 17 hours for those formalities.

Two new cases broke out amongst people landed and detained under observation. The first one being on the 11th June with a member of the crew, and the other one with a foreigner passenger on the 16th of the same month. Both patients were at once transferred to smallpox hospital for treatment.

On the 13th June, 359 of the passengers who had been successfully vaccinated and thoroughly disinfected at quarantine were released; all the rest being kept under observation on account of the new case that had developed. On the 29th June, 137 detects who had had no communications whatever with the second case that had broken out were released; and the balance on the 4th July. All cases of smallpox having fully recovered were discharged from hospital on the following dates: July 9, July 23 and August 12.

The second case of smallpox found on board vessels was discovered amongst steerage passengers of s.s. *Pretorian* which sailed from Glasgow on June 17 with 138 intermediate, 103 steerage passengers and 142 crew, and arrived at quarantine on June 26. All exposed steerage passengers (103) and crew (34) having been landed for usual period of detention, compartments occupied by them thoroughly disinfected and everybody on board vaccinated. This vessel was released after a detention of nine hours.

There were also landed from that steamer 14 firemen who refused to be vaccinated.

No other cases having developed amongst passengers detained under observation they were all released on July 14. Patient having fully recovered was discharged from the hospital on August 6.

The year has still been a very busy one at the station, especially at the hospital where we constantly had to treat a number of patients varying from 25 to 300 at the time.

Preventive treatment by serum has been given to 357 passengers.

Four hundred and fifty-nine bacteriological examinations with many other analysis have been made at the laboratory during the season.

The total number of admissions at the hospital being 947 which is an increase of 109 as compared with last year.

There were 13 deaths and one premature birth.

Deaths were due to following causes or diseases: Measles, 3; diphtheria, 1; diphtheria complicating scarlet fever, 3; scarlet fever, 2; broncho-pneumonia, 1; broncho-pneumonia complicating diphtheria, 1; meningitis complicating scarlet fever, 1, inanition, 1.

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Diphtheria.—Quite an epidemic of this disease threatened to spread over the hospital this season on account of lack of accommodation for the great number of patients that were therein at the time.

On November 6, s.s. *Polanza* arrived at quarantine with many cases of different kinds of infectious diseases, especially of diphtheria. The hospital was at the time so full up with patients that we had to use tents to extend accommodation to some of them. It was thus difficult not to say impossible for us to prevent communications between the different groups, the consequence being that the malady began then to spread rapidly. I instantly removed to the western end of the island all those persons who had not had the disease, and kept them there until all danger had disappeared.

With many precautions and injections of anti-diphtheritic serum we positively succeeded to stop the spread of the disease and to stamp it out entirely.

This is another fact that will show the necessity of having a new hospital built immediately.

Circular Letters.—Letters drawing attention to special cases have been received during season on the following dates: June 13, re Plague bacillus found on steamer from Calcutta bound for Trieste. June 20, re Bubonic plague at San Juan, Porto Rico; and August 10, re Bubonic plague at Liverpool.

The inspection of vessels from those different places have been the subject of special care.

Quarantine Staff.—Dr. L. F. Lepage, who was appointed this year as Medical Quarantine Officer at the Rimouski substation, has been, by your decision, instructed to come up on the mail steamers and make medical inspection between Rimouski and Grosse Isle. This has had for effect to reduce to a minimum the delay caused to those vessels at quarantine; as we only have now to land the quarantinable diseases without making further inspections.

The addition to the staff of another Medical Officer at Grosse Isle has been also of great help in giving dispatch to steamers, and no doubt must have been appreciated by the steamship companies.

The arrangement for our crews to live on board their respective vessels may also be regarded as an important improvement in the service. This tends to give quick dispatch to steamers; the crews being from that fact always on the spot ready for duty at the first call.

Improvements.—A great step has been made this year towards equipping our station with modern buildings, &c., which will prove most convenient to meet emergencies at any time, and will contribute also to avoid complaints from the part of passengers as well as of steamship companies.

The most important improvements consisted in the erection of a new detention building for the first-class passengers; the erection of a laboratory; the extension of western wharf and new buildings for medical assistants and hospital nurses. These works are not quite completed yet, but it is expected that they will be early next season.

The new laboratory will give our bacteriologist every facility to carry out properly his work throughout the whole season. A complete set of most modern laboratory appliances, &c., will be installed therein, and we will then have an equipment of inestimable value for the diagnosis of infectious diseases as well as for any other kind of chemical and bacteriological work.

When the first-class passengers' building is completed according to our plan, we will have at our disposal one of the most modern buildings of the kind to accommodate these.

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The addition of a new 200 feet length to the western wharf is not also the least improvement which has been carried out at this station this year. This was recognized as a great necessity since long ago. While offering for the present a far safer shelter to our quarantine boats, it is, I have reason to hope, a first step towards the realization of the construction of a deep-water wharf. I may perhaps be permitted to say here that another length of about 200 by 100 feet put across the end of that actual wharf so as to form a 'T,' with two solid piers of 25 feet square at about 100 feet distance from each end of crossing head would be sufficient, I believe, to allow any steamer detained in quarantine to moor alongside of it. This would reduce to its minimum the delay caused to infected steamers which have to land their passengers, baggage, provisions, etc., and which have to depend at present upon our small quarantine boats to do that work. The disinfection of steamers could also be carried out more promptly, and I am sure that this would be beneficial to both shipping companies and quarantine service.

Requirements.—As stated above, one of the most urgent needs is unquestionably the immediate construction of a new hospital so as to give better accommodation and comfort to the patients, who are always increasing in number every year; and also prevent thereby the spread of the contagious diseases. Since a few years, the admissions at the hospital have been so numerous that we had to use tents to give shelter to some of them; but this is far from being satisfactory. An idea of the plan for this proposed new hospital has already been submitted to you, and I have reason to believe that this will be carried out next season.

The replacing of the *Alice* by a larger steamer fitted as an ice-breaker is also necessary for the station. This has been rendered expedient by the fact that since a few years the station closed only at end of December—and two years ago was kept open all winter—and our present boats not being built for winter navigation, were unable to continue the station service during that time. We had in those circumstances to apply at the Marine and Fisheries Department for an ice-breaker which was always inconvenient and detrimental to both Quarantine and Marine Services. It has further been experienced that the *Alice* is now too small to properly accommodate the ever-increasing number of immigrants which we have to transfer regularly from the Island to Quebec, together with station supplies, &c.

The old wooden sheds which have been built in 1848 should be replaced by modern brick buildings and appliances.

There are also many other works and repairs of first necessity to be attended to at once, the list of which has already been submitted to you.

We had the honour of your official visit this year, when you had the opportunity to convince yourself and note the different improvements required for this station.

The whole respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

G. E. MARTINEAU, M.D.,

Medical Superintendent of St. Lawrence Quarantine Service.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 3.

(N. E. MacKAY, M.D., M.R.S.C.)

HALIFAX, N.S., March 31, 1913.

Sir,—I have the honour to submit my annual report for the year ended March 31, 1913.

There were 386 vessels inspected during the year, and 157,499 persons classified as follows:—Cabin, 5,286; intermediate, 22,178; steerage, 115,879; crew, 36,327; and 7 cattlemen.

Considerable disease occurred on board the following vessels in the order of their arrival: *Scandinavian* (measles), *Campanello* (diphtheria), *Virginian* (scarlet fever), *Barbarrasa* (scarlet fever), *Royal Edward* (measles), *Scotian* (measles), *Corsican* (measles), *Parisian* (scarlet fever), *Canada* (measles), *Gray Walderee* (measles), *Tunisian* (measles), *Ultonia* (measles), *Mongolian* (measles), *Pomeranian* (measles), *Russia* (chickenpox and measles), *Uranium* (measles), *Empress of Britain* (measles), *Tunisian* (chickenpox), *Hesperian* (measles), *Potsdam* (measles), *Grampian* (measles), *Uranium* (measles), *Royal Edward* (measles), *Dominion* (measles), *Corsican* (measles), *Empress of Ireland* (measles), *Krusk* (scarlet fever), *Teutonic* (measles), *Dominion* (measles).

Sickness other than quarantinable diseases was found on the following vessels:—*Canada* (scrofula), *Birma* (pneumonia), *Russia* (pneumonia), *Voltorno* (appendicitis), *Empress of Ireland* (whooping cough and mumps), *Victorian* (mumps).

Death was reported to have occurred on the voyage on the following steamers: *Barstoe* (heart disease), *Birona* (2 deaths, causes not given), *Georgia* (accident).

There were 115 persons detained at the station hospital during the year, classified as follows:—Measles 31, chickenpox 7, scarlet fever 3, well persons (members of families of the sick) 78.

One of the children ill with scarlet fever developed middle ear disease which later involved the mastoid cells, and a *stücke-schwastegé's* operation was performed and the child made a good recovery.

The following much needed improvements and repairs were made at the station during the year just ended: A residence for the engineer at the station was erected. The house is very nice and comfortable. The disinfecting building, the old hospital, and the steward's residence and outhouses were put in good state of repairs, and the disinfecting buildings and old hospital were painted. They look well. The steerage detention building, the first class detention building, the two small hospitals on top of the hill, the ambulance building and the water tank are being repaired. All the buildings are to be painted, I understand, as soon as the repairs are completed.

All the broken down plaster in the new hospital was repaired, and the woodwork and plaster inside the building were painted. The building is to be painted outside as well. The hospital is now in a fine state of repair and is a credit to the station. Then again a concrete tank was constructed where the soilpipe from the building empties into the harbour. This was necessary to protect the pipe against frost and also to improve the sanitary condition of the institution.

A road was constructed along the shore connecting the disinfecting buildings with the new hospital. This road lowers the grade considerably—it was made for this purpose—and make it much easier to haul coal from the wharf to the different buildings. In the old road the grade was so high that it was as much as a horse could do to haul the ambulance empty up the hill. The new road should be extended along the shore to the old (German) hospital.

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An ice-house should be erected at the station for our own use as well as for the use of the resident staff. It is much needed to keep perishable provisions always fresh.

During the year four steamers, owned by Messrs. Pickford & Black, and trading between this port and the West Indies were fumigated for rats, the holds with sulphur dioxide and the other apartments with formalin and permanganate of potash. In some of the steamers as many as 400 rats were killed.

The ss. *Cromarty* was fumigated for the Marine Department for smallpox and the crew were vaccinated, and bathed, and their effects disinfected with hot steam and formalin and permanganate of potash. This steamer running coastwise from St. John, N.B., brought a case of smallpox into port.

A new captain was appointed on the ss. *Minoca* on the first of January. Capt. Pye is a very capable master. He maintains good discipline, what was much needed, and he also sees that every member of the crew does his work.

We need a young fellow who would keep the captain's room, saloon, doctor's room, and bunks, neat and clean. We needed a man like this more than a new deckhand.

Occasionally we have some trouble with agents of immigration ships. To get rid of the expense of maintaining non-quarantinable diseases steamboat agents want us to take to the station every kind of disease. To carry their point a most absurd diagnosis is often made.

During the year we lost by death, Mr. John O'Neil, a most capable officer.

My assistant, Dr. V. N. MacKay, has done his work well. The nurse and matron, Miss Himmelman, is deserving of every praise for the way in which she keeps the hospital and looks after the sick. We have an ideal hospital.

I have the honour to be, sir,

Your obedient servant,

N. E. MacKAY, M.D., M.R.C.S.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 4.

R. C. ROOPE, M.D.

St. John, N.B., March 31, 1913.

Sir,—I have the honour to submit my annual report for the year ending March 31, 1913.

During the year just ended we have inspected at this station 149 vessels.

The total number of persons inspected were 37,911. Classified as follows: 1st cabin, 898; 2nd cabin, 5,129; steerage, 21,426; cattlemen, 26; crew, 10,433.

There were treated at our hospital during the year 32 cases, for the following diseases: measles, meningitis, typhoid fever, pneumonia and mumps. Two deaths occurred, one from broncho-pneumonia and measles, and one from marasmus.

We have now in our hospital one case of pneumonia, one of meningitis, and a number of cases of measles.

Improvements.—I might say that our new cottages, one for the bacteriologist, one for the boatman, one for the assistant caretaker, and a bacteriological laboratory, are in course of construction. Owing to the cold and stormy weather, and the lateness of the season in which the work was commenced, has hindered a speedy completion.

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A general overhauling in the plumbing of the different buildings has been done. Considerable shingling has been done. Our roofs were in a very bad condition owing to the salt air rusting off the nails in the shingles. The nails will not last more than eight or ten years. The new shingling was done with galvanized nails, which are also used in the shingling of our new buildings.

A new telephone cable has been laid, and is giving fairly good service, the old one gave out beyond repair.

Our water pipe gave out early in the fall, since then we have been getting our water by tug from the city, and pumping it up to the different buildings. I believe a new pipe is to be laid this coming spring, which I hope will solve the long needed water problem. A new concrete walk has been laid at the medical superintendent's house, and blasting of rock and grading on the roads have been done. We have a new ambulance, which has been of very great service.

Our most pressing need is a wharf out to low water, and a government owned boat. A wharf where our boat can lay with her crew on board, so as to be obtainable at all times. Many times as it is now it is impossible to get aboard the quarantine tug on account of the big seas running, and at low water often impossible. Several times this winter we have had to leave the patients on board the ship from one to two days before we were able to land them. Before we will ever be able to board vessels and bring the sick off safely and humanely, the wharf and boat I speak of will have to be furnished.

Quarantine Staff.—I am pleased to inform you of the splendid service given me this winter by Dr. J. J. Heagerty, in the way of boarding and general assistance for the good of our station; Dr. Heagerty is always ready and willing at a moment's notice, night or day. And being on the city side of the harbour, he could get the tug and board a vessel when the tug could not get to me on the Island. I am pleased to say he has saved the shipping men and quarantine service a great deal of inconvenience by his promptness and ability.

We had the pleasure and honour of you and your private secretary to visit us at this station during the last summer. And after your careful inspection of the station you found many needs and improvements necessary to have the work carried out in the interest of public health.

With the bright prospect of a new water pipe, a new wharf, and a new boat, I think I can safely say that these needs supplied, no word of complaint would be heard regarding our quarantine station.

I have the honour to be, sir,

Your obedient servant,

R. C. RUDDICK, M.D.,

Medical Superintendent, St. John Quarantine Station.

The Honourable the Minister of Agriculture,
Ottawa.

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APPENDIX No. 5.

(EDWARD DUVERNET, M.D.)

DIGBY, April 1, 1913.

SIR,—I beg to report that for the ten and a half months that this quarantine station has been established eleven vessels have been inspected, all of which were found to be free from infectious diseases, and were released from quarantine within two hours after arrival.

I have the honour to be, sir,

Your obedient servant,

E. DUVERNET, M.D.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 6.

(WM. MCK. McLEOD, M.D.)

NORTH SYDNEY, C.B., March 31, 1913.

Sir,—I have the honour to forward my report for the year ending March 31st, 1913.

During the year there arrived at quarantine anchorage for inspection 112 vessels—96 steamships and 16 sailing vessels.

No quarantinable diseases were found on any of the vessels inspected.

I have the honour to be, sir,

Your obedient servant,

WM. MCK. McLEOD, M.D.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 7.

(D. A. MORRISON, M.D.)

LOUISBURG, N.S., April 1, 1913.

SIR,—I have the honour to submit herewith my report for this station for the year ended March 31, 1913.

The total number of ships inspected at this port for the year was 40. From the 6th of August, 1912, on which date I assumed charge of the station, to the 31st ult., I inspected 16 ships, having on board 1,731 persons, classified as follows:—

Seventy-eight cabin, 1,048 steerage, 1 stowaway, and 604 crew.

No quarantinable disease was found on any of the ships inspected.

I have the honour to be, sir,

Your obedient servant,

D. A. MORRISON, M.D.

The Honourable the Minister of Agriculture,
Ottawa, Can.

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APPENDIX No. 8.

(J. BAXTER, M.D.)

CHATHAM, March 31, 1913.

Sir,—I beg leave to submit the following report for the year ending to-day. The number of vessels examined by me was in all 44, consisting of 31 steamers, 1 ship, 7 barques, 3 barquentines, 1 four-masted schooner, 1 petrol auxilliary schooner.

The number of men examined was 1,058.

There was found no quarantinable disease. Among the vessels there were two of the largest craft that ever were in the river, viz.: Ship *Nordfarrer*, 2,699 tons; ss. *Thode Fageland*, 2,826 tons.

I have the honour to be, sir,

Your obedient servant.

J. BAXTER, M.D.

The Honourable,
The Minister of Agriculture,
Ottawa.

APPENDIX No. 9.

(PETER CONROY, M.D.)

CHARLOTTETOWN, P.E.I., March 31, 1913.

Sir,—I have the honour to submit my report for the year ending March 31, 1913.

There was no case of contagious disease at the station during the past year.

The neighbouring provinces against which this island enjoys federal quarantine protection have been free during the past year from epidemic disease, and vessels from ports in these provinces were allowed pratique without inspection. There were four inspections of vessels from across the sea and West Indies.

The unusually stormy weather of the past season had the effect of compelling a number of sailing vessels, bound for this port, to seek shelter at different harbours of Nova Scotia and make customs entry there.

The winter steamers made regular trips to this port during the past season, excepting in an interval between the 10th of February and the 18th of March, when they were on the Georgetown-Pictou route. The steamers resumed their sailings to this port on March 18, and will now continue on this route until the regular opening of navigation.

The requirements of the service at the station are well supplied.

I have the honour to be, sir,

Your obedient servant,

P. CONROY, M.D.,
Inspecting Physician.

The Honourable
The Minister of Agriculture,
Ottawa.

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APPENDIX No. 10.

(A. T. WATT, M.D.)

WILLIAM HEAD, B.C., March 31, 1913.

Sir,—I have the honour to submit this my report of transactions at William Head quarantine station for the twelve months ending March 31, 1913.

During the twelve months 162 vessels were inspected. There were 4,940 cabin passengers and 17,653 steerage passengers on these vessels and the members of the crews numbered in all 13,725.

Vessels were quarantined at three different times on account of smallpox. The ss. *Monteagle* arrived April 16, 1912, and reported that a case of smallpox had been discovered amongst Chinese steerage passengers shortly after leaving Japan, and that the patient had been at once isolated. During the first night in hospital the Chinaman had hanged himself. The body was buried at sea. The steerage from which this man had been taken was separated from other parts of vessel and owing to the fact that disinfection of compartment was possible and had apparently been thoroughly carried out, it was considered in view of this and the circumstance of the early isolation of the case that the period of detention might be dated from the day the disinfection was done on board vessel. After further precautionary disinfection here the steamer was released with the saloon passengers and such of crew as were found to be satisfactorily protected by vaccination. The steerage passengers and some of crew were held at station but no further case developed. The ss. *Roman*, a halibut vessel, was sent down from New Westminster on May 8, 1912, by the provincial health authorities, as a case of smallpox had been found amongst crew. The steamer was disinfected and all on board vaccinated. Then the vessel was allowed to proceed to fishing grounds. On returning all were in good health and were released. The expenses of disinfecting this vessel were met by the owners. At this date the ss. *Monteagle* is again in quarantine. The steamer arrived on the 30th instant and the report was given that one of saloon passengers had developed varioloid on the night of the 28th. On examination of steerage passengers one of Chinese was found also to have varioloid and to be showing much the same development. Both passengers had come on board at Hong Kong, on March 8, so that the infection presumably was from an exposure in one of the ports in Japan, possibly from an ambulant case amongst the stevedores. All passengers have been landed also a number of the crew and the vessel which is undergoing disinfection is upon completion to be released.

Cases of diphtheria were found on ss. *Monteagle*, arriving June 22, 1912, and on ss. *Marama*, arriving January 9, 1913. These cases were by arrangement treated at the city isolation hospitals at Victoria and Vancouver. One case of chicken-pox, a child arriving by ss. *Inaga Maru*, on July 4, 1912, was treated at hospital here. This case and the two cases of smallpox now here are the only cases of infectious disease which have been cared for at the hospital at William Head during the year. Cases of mumps, typhoid fever and beri-beri have been found amongst crew of different vessels but as they were convalescing and being properly cared for and isolated they were not landed here.

Two vessels had had cases of plague on board and two vessels had had cases of cholera on board between Hong Kong or Shanghai and Japanese ports. In each instance the measures taken at the quarantine stations in Japan where the cases were discovered, prevented further outbreak.

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There has been less disease in Hong Kong and districts around Canton latterly than has been the case for a number of years past. In consequence the routine disinfection of Chinese steerage passengers and their effects has been discontinued by your order given December 20, 1912. Passengers from Japan still undergo the routine disinfection.

There have been several improvements commenced or carried to completion during past twelve months. The saloon passenger accommodation is being bettered by addition of new bath rooms and laundry, quarters for stewards in attendance, and by installation of a system of hot water heating for the main building. A hall which will be available for various purposes, such as church service or for entertainments or for other additional accommodation is being built close to. Bath rooms are also under contract at the disinfection building, and some of the wood partitions are to be replaced by brick walls. When this work is completed the building will be more sanitary and more proof against fire. Four extra baggage cars have been purchased. These will permit of baggage being handled more readily. A 20 h.p gasoline plant has been installed for electric lighting of station. This will be cheaper to operate than the steam plant, which now need be run only when the full lighting capacity is called for, when all buildings are occupied at a time of quarantine. New ranges have been put in at the various detention buildings and at some of the other buildings where needed. Slates have been put on roof of superintendent's residence and on smallpox hospital, and some painting has been done to these buildings and to sheds on wharfs. General repairs have been effected at wharfs, and new fender piles driven. Some repairs to roads have been made and a new bridge built.

D'Arcy Island Lazaretto was used for accommodation of four Chinese lepers while awaiting deportation under the Immigration Act. The death of one man occurred at the island, but the other three cases were deported on proper arrangements being made for their accommodation. The expense of this and of their detention at the island were met by the steamship companies who had brought these Chinese to Canada.

The station was visited by yourself during the summer, and also by Dr. F. Montizambert, Director General of Public Health, and the further needs of the station inquired into.

I have the honour to be, sir,

Your obedient servant,

A. J. WATT, M.D.,

Supt. B.C. Quarantines.

The Honourable the Minister of Agriculture,
Ottawa.

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APPENDIX No. 11.

(R. L. FRASER, M.D.)

VICTORIA, B.C., March 31, 1913.

Sir,—I beg to submit my report for the year just ended. Coasting vessels being exempt from quarantine regulations. No inspections were made at this port during the year.

On 30th instant I visited William Head station to confer with Dr. Watt *re* disease on ss. *Monteagle*.

I have the honour to be, sir,

Your obedient servant,

R. L. FRASER, M.D.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 12.

(J. D. HUNTER, M.D.)

VICTORIA, B.C., April 10, 1913.

Sir,—I beg to submit my report as bacteriologist at the William Head quarantine station for the year ending March 31, 1913.

The laboratory has not been required for government purposes during the year, but everything therein is in order and in readiness for any work that may be required.

In May, 1912, at the request of the superintendent, I visited the plague laboratory at Seattle, Washington. While there I was extended every courtesy by Dr. Lloyd, the official in charge and under his direction was given great assistance in studying the morphology, &c., of the *B. Pestis*.

I have the honour to be, sir,

Your obedient servant,

J. D. HUNTER,

Bacteriologist and Assistant Medical Officer.

The Honourable the Minister of Agriculture,
Ottawa.

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APPENDIX No. 13.

(L. N. MACKECHNIE, M.D.)

VANCOUVER, B.C., April 20, 1913.

Sir,—I have the honour to submit as follows, my report for the year ending March 31.

One vessel has been examined and no case of infectious or contagious disease was found.

A sulphur fumigator has been received and is under cover at the entrance of No. 2 freight shed of the Canadian Pacific Railway Company by their permission.

I have the honour to be, sir,

Your obedient servant,

L. N. MACKECHNIE, M.D.,

Quarantine Officer.

The Honourable the Minister of Agriculture,
Ottawa.

APPENDIX No. 14.

(H. ERNEST TREMAYNE, M.D.)

PRINCE RUPERT, April 1, 1913.

Sir,—I have the honour to make my annual report for the year ending March 31, 1913.

No quarantinable diseases of any kind have arrived at this port.

I am glad to inform you that the wharf at the station is practically completed.

Owing to the early completion of the Grand Trunk Pacific railway, and the establishment of a direct line of steamships with the Orient, it will be necessary to proceed very shortly with the erection and equipment of the necessary buildings at the station, in order to have everything in readiness when required.

I have the honour to be, sir,

Your obedient servant,

H. ERNEST TREMAYNE.

The Honourable
The Minister of Agriculture,
Ottawa.

APPENDIX No. 15.

(J. A. LANGIS, M.D.)

TRACADIE, N.B., March 31, 1913.

Sir,—I have the honour to submit this my annual report as medical superintendent of the lazaretto at Tracadie, N.B.

There are at present 21 patients in the institution, 11 males and 10 females.

No deaths and no admissions during the year.

Seventeen of our patients are of French, two of English, one of Icelandic and one of Russian origin.

Their ages vary from nine to eighty-one years. They have generally been exempt from intercurrent illness but for the exception of one case of erysipelas and one of erythema nodosum.

I have as in former years, visited every four months, these sections of the province, which furnish from time to time, our patients for the lazaretto, and I am pleased to say, that the families suspected and so visited are all free from the disease.

The Dr. Deyeke's nastin therapy followed here since May, 1911, is giving fairly satisfactory results.

I had at first fifteen patients to treat and gave between thirty-six to sixty-eight injections of nastin to each. With this, as with any other treatment, a few patients attributed intercurrent illness to its use, and refused it, after a few injections.

As it was most earnestly recommended by the discoverer, to give the nastin treatment, the form of a chronic intermittent treatment. I have followed his advice, and think it the proper mode to use it.

Generally the patient suffers from ten to thirty minutes, from the burning sensation produced by the medicine at the place of the injection, but after this abates, he has a general sensation of warmth, feels stimulated and stronger.

With mostly all patients there is an elevation of temperature for a few hours after the injection, which varies from one to two degrees.

Old anaesthetic cases are very little helped by Nastin, but we have discharged two patients who were at the early stage of this type of leprosy. One, a man of thirty-nine, left a year ago, he received only twenty injections of nastin. I have visited him twice since and he remains well. The other case, a man of sixty-seven, left in November last, he had received sixty injections. I saw him recently and found him in good health, free from the disease. Both had been taking the old treatment, chaulmoogra oil, strychnine, &c.

Another case of mixed leprosy is that much improved that I have great hopes to discharge him in the near future.

With five nodular cases, there has been, for a certain time, arrest of the leprous process with some retrogression of the leprous symptoms. Three of these are certainly better to-day, the two others are in the last stage of the disease.

With this treatment by nastin the patients have been taking the chaulmoogra oil, strychnine, &c., and would not stop it, only when it interferes with their digestion. Thus the old treatment is still the most popular.

In conclusion, nastin has some beneficial effect on some of our cases of leprosy and I am still using it for a few of them.

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The patients are supplied with musical instruments and some games, to help them pass away the time and divert their thoughts from themselves. They are taking advantage of these amusements and seem to enjoy them. The Sisters make every effort to contribute to their physical and moral comfort and respond to many calls by day and by night.

I have the honour to be, sir,

Your obedient servant,

J. A. LANGIS, M.D.

To the Honourable
The Minister of Agriculture,
Ottawa.

APPENDIX No. 16.

(CHAS. A. L. FISHER, J.P.)

Montreal, March 31, 1913.

Sir,—I have the honor to submit this my report for the twelve months ended March 31, 1913, as Public Works (Health) Inspector, for the territory from Winnipeg east to the Atlantic ocean.

During that period I have personally visited and inspected all such works covered by the Public Works (Health) Act, 1899, as have been brought to my notice.

The term has again been an exceptional one, in the almost non-appearance of contagious and infectious diseases among the men employed on the various public works of the Dominion, coming under my inspection but there have been a good many cases of typhoid fever in the camp hospitals, mostly on the new construction work of the Canadian Northern railway, east from Port Arthur.

I am pleased to be able to report again, that on my several tours of inspection of the public works of the Dominion in my district for the past year, I found the medical service given to be complete, and the sleeping quarters and boarding of the men to be fully equal to the very good conditions in that way reported previously.

The number of public works coming under the regulations of the Act, in the territory east of Winnipeg, have been comprised exclusively of railway construction, and include the Canadian Northern Railway Tunnel under the Mountain at Montreal.

The following is a detailed report of the works I have personally visited and inspected during the past twelve months, as coming under the regulations of the Public Works (Health) Act, 1889:

NATIONAL TRANSCONTINENTAL RAILWAY.

This road is being built by the Dominion Government, and at present all the sections between Winnipeg and Moncton, N.B., are under construction, or have been completed.

I am pleased to report that on my visits to the works on said sections I found, as previously, excellent hospital accommodation provided, and a duly qualified physician as district medical supervisor over each section of camps, which could be conveniently covered by him within the requirements of the regulations.

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With the exception of some cases of typhoid fever, there had been no outbreak of contagious diseases, and the health of the men had been excellent.

I give below the extent and location of the camps, with other particulars of the works carried on by the various sub-contractors:

Superior Junction Section.—From Superior Junction east for 150 miles to Junction of the Western section let to Messrs. E. F. & G. E. Fauquier. This is under contract to Messrs. O'Brien, Fowler & McDougall Bros., who have their headquarters at Superior Junction, Ont.

J. E. Joseph, of Pembroke, Ont., is the chief medical officer for the contractors, and J. M. McGrady, M.D., of Port Arthur, is the medical officer in charge of the work.

Superior Junction Camps.—Six gravel pits operated by the contractors, and the Pembroke Contracting Company, and Messrs. Morris, Mackie & Co., being the sub-contractors, also a steel gang operated by the chief contractors.

About 900 men were employed, who were located in eight camps, and housed and boarded in log and board dwellings by the contractors and sub-contractors, and the steel gang in boarding cars.

There were no cases of contagious disease, and the health of the men and the sanitary conditions were good. There have been a few minor accidents, but no deaths. Two good hospitals are maintained on the work, one located about twelve miles from Superior Junction, and the other towards the east end of the contract. W. Graham, M.D., and G. E. Denison, M.D., have been the medical officers in charge, with John Brandon, M.D., as general medical supervisor.

Nipigon Section.—From the east end of O'Brien, Fowler & McDougall Bros.' contract, east 75 miles. This is under contract to Messrs. E. F. & G. E. Fauquier, of Ottawa, who have sub-let it to the Nipigon Construction Company, Limited, who have their headquarters at Nipigon, Ont. This work is about completed.

Missanabie Section.—This is under contract to Messrs M. P. & J. T. Davis, of Quebec, who have sub-let it to Messrs. O'Brien, McDougall & O'Gorman, the contract covering the route from the east end of the Nipigon work, for 150 miles further east, to the junction of the Abitibi work, under contract to Messrs. E. F. & G. E. Fauquier.

Missanabie Camps.—There were six sub-contractors on this work, and about 1,000 men employed, who were located in nine camps, and housed and boarded in wooden buildings by the sub-contractors.

There were two cases of measles and three deaths, two by jumping from train, and one smothered by falling earth. The general health of the men was excellent, and the sanitary condition of the camps was good. There were two hospitals on the work. A. Henderson, M.D., of Cochrane, Ont., is the chief medical officer, and he had two assistants, one in charge of each hospital, as follows: Dr. Kinsey and Dr. Lipman.

Abitibi Section West.—From about eight miles west of the Abitibi river, crossing westerly for 100 miles. This is under contract to Messrs. E. F. & G. E. Fauquier, of Ottawa. Access thereto is had from Cochrane, Ont. A. Henderson, M.D., is the chief medical officer of the work, with residence at Cochrane.

Abitibi West Camps.—E. F. Fauquier is the sub-contractor. About 300 men are employed, who are located in five camps, extending over 50 miles of the work, and they are housed and boarded in log buildings by the sub-contractor.

There were two deaths from accident. The health of the men and the sanitary conditions of the camps were good. There was one well-fitted hospital on the work, the chief medical officer, Dr. Henderson, residing at Cochrane, and visiting the camps adjacent. This section is completed.

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Abitibi Section East.—From about eight miles west of the Abitibi river, crossing easterly for 150 miles. This section is under contract to the Grand Trunk Pacific Construction Company, and was sub-let by them to Messrs. Foley, Welch & Stewart, who had their headquarters at Cochrane, Ont.

Only one hospital has lately been maintained on the work. John McCombe, M.D., is the chief medical officer, with two district medical officers as assistants.

Abitibi East Camps.—Messrs. Foley & Co., and Shea & Egan were the sub-contractors, with three sub-contractors under them.

About 400 men were employed, who were located along the line in four camps and several house cars, and boarded and housed in wooden buildings and cars by the sub-contractors. There were two deaths, one from accident and one from drowning. There were two cases of erysipelas. The general health of the men and the sanitary conditions of the camps were good. One excellent hospital was maintained for these camps, located at Peter Brown Creek, within easy access to the construction works and camps. D. R. Cameron was the resident medical officer latterly on the work, and had the assistance of Dr. L. M. Dawson in the early part of the season. This work is now about completed.

Ontario and Quebec Section.—From the easterly limit of the Abitibi East Section, sub-let to Messrs. Foley, Welch and Stewart, to a junction with the Quebec West Section at Weymontachene, Que., about 250 miles. This work is under direct contract to Messrs. Macdonnell & O'Brien, and entrance thereto is over their other contracts for the Transcontinental, lately completed by them from Hervey Junction, Que. John McCombe, M.D., is the chief medical officer of the work.

Ontario and Quebec Camps.—Messrs. F. Munro & Co., Macdonnell Co., M. McCarthy, C. L. Hervey, Craig and Thompson, Doheny & Gordon, Frank Waters, Hugh Grant, H. McKinnon, Donovan & Co., O'Brien & Martin, Shea & Egan, The A. J. Hill Co., and Lynn and Brennan are the sub-contractors.

About 3,350 men are employed, who are located along the line in twenty-four camps, and boarded and lodged in wooden buildings by the sub-contractors.

There were two cases of erysipelas and one of typhoid. There were eight deaths, one being from typhoid, one by falling off train, two drowned, one of erysipelas, one killed by derrick, one killed by dump car and one accident. The general health of the men and the sanitary conditions of the camps were good.

Three hospitals were maintained for these camps: No. 1, being a very large main hospital, with four separate wards, and located alongside the track; No. 2, is located at the end of steel; No. 3 is located at Peter Brown creek, as convenient as possible for the west camps of the work.

Doctors Thos. H. Jackson, J. P. Benny and D. R. Cameron, are the district medical officers of the work, one residing in each hospital. John McCombe, M.D., the chief medical officer of the work resides at the hospital, west from La Tuque, and takes charge of and gives the work his general supervision.

CANADIAN NORTHERN ONTARIO RAILWAY.

Port Arthur, Sudbury Section.—This road is being built by Messrs. Mackenzie, Mann & Co., from Port Arthur to Ruel, Ont., a distance of about 550 miles and when completed is to form part of the Canadian Northern Transcontinental line from the Pacific to the Atlantic oceans.

Messrs. Foley, Welch & Stewart and the Northern Construction Co., are the chief contractors. Messrs. Mackenzie & Mackenzie, M.D.'s are the chief medical officers of all the work, and have their headquarters at Winnipeg.

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Loon Camps.—Port Arthur to Red Rock, a distance of 60 miles, P. T. Walsh was the contractor, with twelve sub-contractors, each for short distances under him about 1,020 men were employed, who were located in twelve camps distributed along the route, and were housed and boarded in log or wood buildings by the various sub-contractors.

There had been no contagious or infectious disease, or serious accidents and no deaths. The general sanitary conditions and the water supply were only fair, but the general health of the men had been good.

The St. John Hospital at Port Arthur and the Nipigon Hospital at Nipigon, these being at each end of the work, were used as there is rail service over the Canadian Pacific line.

Austin Evans, M.D., was the district medical officer on the work, which is now completed.

Nipigon Camps.—From Nipigon northeast about 90 miles. The Nipigon Construction Co., were the contractors with eleven sub-contractors under them. About 1,500 men were employed, who were located in fourteen camps, distributed along the route and who were housed and boarded in wooden buildings by and with whom they were employed.

There were twenty-five cases of typhoid, four fatal accidents, and nine deaths, two from explosion, three from typhoid pneumonia, three from land slide and one from drowning.

There were three hospitals, one at Nipigon, mile 71, one at Orient bay, mile 111, and one at Pack Pine, mile 142.

The following were the resident medical officers at the hospitals during the year: A. H. Veitch, C. A. McPherson, M. Thompson, R. Stirrett, Frank Kelly, E. Evans, and E. C. Hanna, all qualified medical men.

Nimigos Camps.—From mile 155 to 200, Foley Bros. and the Northern Construction Co., were the contractors, with several sub-contractors under them. About 1,700 men were employed, who were located in twelve camps situated along the route, and were housed and boarded in wooden buildings, by the contractors or their subs.

There had been no contagious disease, but there were three deaths, one from drowning, one from drinking wood alcohol, and one from heart failure.

The sanitary conditions and the general health of the men had been good, and the water supply excellent.

There were four hospitals maintained for these camps, one at mileage 156, one at Nimigos, mileage 162, one north from Chapleau at mileage 192, and one at Long Lake, mileage 100.

There were four qualified medical officers for these camps, one residing at each hospital.

Missanabie Camps.—From mile 209 to 265, Foley Bros. and the Northern Construction Co., were the contractors, and had camps located along the route. About 275 men were employed and were housed and boarded in wooden buildings by the contractors.

There had been no contagious diseases, or serious accidents, and but one death caused by cerebral abscess.

There were two hospitals maintained, one at mile 233, and one at mile 256. The resident medical officers on the work during the year were Edgar Bissell, N. J. Barton, E. C. Hanna, and Russell Demers, all qualified men.

Hobon Camps.—From mile 265 to mile 320, Foley Bros. and the Northern Construction Co. were the contractors, and had camps located along the route.

About 650 men were employed, who were housed and boarded by the contractors in wooden buildings.

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There was one tubercular patient, who was sent to a sanatorium. There were no serious accidents, and no deaths. A good hospital was maintained at mile 300, and C. R. Young, M.D. resided thereat.

Bremner Camps.—From mile 320 to mile 362, Foley Bros. and the Northern Construction Co. were the contractors, and had three camps along the route. About 275 men were employed, who were lodged and boarded in wooden buildings. There had been no serious accidents, diseases, or deaths. A good hospital was maintained at mile 362, and R. A. Dick, M.D. was the resident medical officer.

Ruel Camps.—These are at the extreme easterly end of the whole contract, and the work runs west from Gowganda Junction, the terminus of the present branch line being operated west from Sudbury, Ont. Foley Bros. and the Northern Construction Co., were the contractors, and had eighteen camps located along the route.

About 1,550 men were employed, who were housed and boarded in wooden buildings by the contractors.

There had been no cases of typhoid, no other infectious diseases, there were two serious accidents, and three deaths, from two dynamite explosions. The general sanitary conditions were fair, the water supply excellent and the general health of the men, good.

There were three hospitals maintained on the work, one at mile 91, one at mile 105, and one at mile 125. The following qualified medical officers were resident on the work, during the year, viz: E. J. Finnerty, Thomas Phipps, W. W. Smith, Wm. Cody, L. R. Yealland, and D. C. Richardson.

Section between Sudbury and Ottawa.—This is another part of the Transcontinental line, and is under contract from Sudbury to Pembroke, Ont., by Angus Sinclair, C.E., as chief contractor.

J. Mitchell, M.D., of Toronto, is medical superintendent of this section.

Onwatin Camps.—There were six sub-contractors, having in all seven camps, and employing about 500 men, who are housed and boarded in wooden buildings by the said sub-contractors. There were three cases of measles. There were two serious accidents, with two deaths, one from dynamite explosion, and one man killed by falling rock. The general health of the men, the sanitary conditions of camps, and the water supply were good.

The St. Joseph's Hospital at Sudbury was used. W. N. Robertson, M.D., C.M., was the district medical officer of the camps.

North Bay Camps.—There were three sub-contractors with one camp each, and about 450 men were employed, who are housed and boarded in wooden buildings. There had been no contagious and infectious diseases. There were four deaths from accidents. The health of the men and the general sanitary conditions of camps were good.

Dr. Campbell, of North Bay, was the District Medical Officer of these camps.

Mattawa Camps.—There were three sub-contractors on this work, with three camps. About 450 men were employed who were housed and boarded in wooden buildings by the sub-contractors.

There were three cases of syphilis, two of gonorrhœa, one of tuberculosis, but no deaths or accidents, the general health of the men being good, and the sanitary conditions fair. There was a small hospital on the work, and one at Mattawa for major cases. Doctors W. R. Bateman and D. G. McKay were the resident district medical officers of the work.

Kills Camps.—There were three sub-contractors on this work, with six camps. About 300 men were employed, who were housed in board camps, and catered for by the sub-contractors.

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There were no serious diseases, deaths or accidents, the sanitary conditions and the general health of the men being good. The hospital at Mattawa was used if necessary. Doctors Malcolm Kinsella and Ivan Annitt, of Kilsnoy, were the medical officers of the work.

CANADIAN PACIFIC RAILWAY.

Tunnel under Montreal Mountain.—This is a part of the work in connection with a Canadian Northern Transcontinental railway, and will give that road a western entrance into the city of Montreal. Messrs. Mackenzie, Mann & Co., of Toronto, Ont., are the chief contractors, and Mr. Sidney P. Brown is the chief engineer in charge of the work.

About 600 men are employed, most of whom live in their own houses, and the balance in houses provided by the contractors. The men are boarded by the Consolidated Boarding and Supply Company, of Montreal.

There have been no contagious diseases, fatal accidents or deaths. An emergency hospital is maintained at the West Portal Camp. Doctors Mackenzie & Mackenzie, of Winnipeg, are the chief medical officers, and J. A. Charette, M.D., of Montreal, is the medical supervisor of the men employed.

CANADIAN PACIFIC RAILWAY.

Main Line Extension.—From Mile 65 to a connection with the Canadian Pacific railway at Hobson, Ont., thence to a connection with the Canadian Northern railway at Oba lake, and thence to a connection with the Transcontinental railway at Hearst, Ont. The Superior Construction Co., Ltd., of Sudbury, Ont., T. J. Kennedy, of Sudbury, Ont., and Boarke & McGinnty, were the chief contractors.

About 1,500 men were employed, who were located in sixteen camps distributed along the route, and were housed and boarded in wooden buildings by the said contractors or the Federal Commissary and Supply Co.

There were three cases of erysipelas, two serious accidents, and two deaths from explosions.

The general health of the men, and the sanitary conditions of the camps were good.

Four good hospitals were maintained on the work, one at Oba lake, one at Hobson, one at camp 1, and one at Hearst. R. M. Leam, M.D., of Sault Ste. Marie, Ont., is the chief medical officer, and had the following assistants during the year as district medical officers on the work: J. P. McDermott, W. A. Strickland, and D. MacKnight and G. B. Kindrick.

All work on this line has been closed down since last November.

Algoma Eastern Branch.—From Little Current, Ont., north to Whitefish, &c. The Superior Construction Co., were the chief contractors.

About 300 men were employed and were housed and boarded in wood buildings by the contractors. There was one case of typhoid, two serious accidents and two deaths therefrom. The general health of the men and the sanitary condition of the camps were good.

The General Hospital at Sudbury was used. Jas R. McLean, M.D., was the chief medical officer, and Lloyd L. Buck was the resident medical officer on the work.

All work on this branch was closed down last November.

On the above public works in the territory east from Winnipeg, Man., during the term reported on, there was an average of 17,020 men employed, with 46 qualified medical officers in charge of camp hospitals and camps.

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Cases of contagious and infectious diseases—	
Measles.. . . .	5
Gonorrhœa.. . . .	4
Tuberculosis.. . . .	2
Typhoid fever.. . . .	29
Erysipelas.. . . .	10
Syphilis.. . . .	1
Deaths and causes as under—	
Syphilis.. . . .	1
Erysipelas.. . . .	1
Cerebral abscess.. . . .	1
Heart failure.. . . .	2
Tuberculosis.. . . .	2
Typhoid fever.. . . .	3
Drowning.. . . .	6
Killed by derrick.. . . .	1
Accidents.. . . .	14
Gasoline explosion.. . . .	2
Drinking wood alcohol.. . . .	1
Crushed by cars.. . . .	1
Falling off train.. . . .	2
General debility.. . . .	1
Dynamite explosion.. . . .	10
Total deaths as above.. . . .	
	48

In closing this report for the past twelve months, I am pleased to be able to draw your attention to the fact that although the number of men employed shows about the same as last year, the cases of typhoid fever have been decreased almost one-half, and the deaths fewer than those reported in the previous year. This I consider as due to the sanitary conditions on which the camps were kept, and the care and attention given by the contractors and medical officers in carrying out sanitary conditions, and such clauses of the regulations of the Public Works (Health) Act, 1899, as applied thereto.

In concluding this report, I beg to again suggest for your attention, that for the benefit and convenience of contractors and district medical officers of camps, and for the welfare of employees on public works, that the regulations at present applying under the said Act, be amended within as little delay as possible.

I have the honour to be, sir,
Your obedient servant,

CHAS. A. L. FISHER,
Public Works Health Inspector.

The Honourable
The Minister of Agriculture,
Ottawa, Ont.

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APPENDIX No. 17.

(A. E. CLENDENAN, M.D.)

EDMONTON, ALTA., April 1, 1913.

SIR,—I have the honour to submit the following report for the year ending March 31, 1913, as inspector under the Public Works (Health) Act, as applied to Western Canada:—

The volume of work has greatly increased during the last three years, with more than ever in prospect for the next twelve months. With few exceptions, the medical service has been up to the requirements of the Act, and bona fide complaints are few. Many of the doctors use motor cars, especially on the prairies, and have thereby increased their effectiveness. A charge of one dollar (\$1) per month to employees is made everywhere in my district. The service demanded now-a-days costs that amount where men are employed in small numbers, and close to it when there are thousands on a single contract. The employees in the open country are housed mostly under canvas, and through the mountains, where the work is more permanent, in log buildings and in those made of boards covered with tar paper. With the exception of the office tents, the canvas structures are seldom floored, while about half the log and board buildings have hewed logs or lumber laid down. Camp sites are nearly always wisely chosen, with a view to drainage and water supply, as well as convenience to work.

The fly nuisance is *par excellence* the evil to be contended with, and could be improved by special regulations enforcing screen doors and windows for all kitchens and dining rooms and screen closets. Good food and good cooking prevails everywhere except with some stationmen who supply themselves.

The contracts are not necessarily given below in the order visited, since so much detail would make an annual report cumbersome.

The general health conditions have been exceptionally good. There was no small-pox beyond a few mild or doubtful cases. There was fifty-seven cases of typhoid from April to September on the Canadian Pacific Irrigation Company's ditch work, east of Calgary. No other epidemic outbreaks took place requiring special mention. On all work there was 17,046 employed at the time of inspection and disposed as given hereafter.

CANADIAN PACIFIC RAILWAY.

Lacombe-Moosejaw Line.—Coronation East, 19 miles, contractor was Frank Jackson, and his sub-contractors, Brown, Stokke and Van Buskirk, employing 205 men. There was also a ballasting gang working on 60 miles and 40 miles of track-laying. Dr. Hurlburt of Coronation, was in charge of the ballasting and tracklaying, and Dr. Mooney, of Consort, on the grade. The water supply was from wells, only, for this part of the line is wholly within what is known as the 'dry belt.' Health conditions were good. The hospital was at Coronation.

Weyburn—Lethbridge (a) Stirling East.—The contractor was John Timothy, and the sub-contractors were Sullivan, Scott & Reid, Bailey, Larsen & Peterson, and Foley Brothers. 136 men were employed, and were in charge of Dr. F. A. Keillor, of Raymond, who had a hospital at Stirling. There was 25 miles to cover, and the service was satisfactory.

Weyburn—Westerly (b).—Ed. Petersen was the contractor, and the sub-contractors were Morrissey, Davis, Sampson & Sons, Wynn, Shipman Brothers, Leach & Rutledge, Struder & Gorman, Schultz Brothers, McKenna and many stationmen, 355 men were employed. Dr. Wheeler was in charge, with a hospital 16 miles west of Viceroy. Wells had to be depended on, and water was in many cases hauled considerable distances, and even then often quite alkaline. There was no sickness.

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Suffield-Kipp.—J. G. Hargraves was chief contractor, and the sub-contractors were Morrison & Kusack, McLee, Anderson and Kerr. There were only 261 men on the job, and were looked after by Dr. Steele, of Suffield, who travelled along the line every week en route to visit the camps of the Southern Alberta Land Irrigation Company. Arrangements had been made to send patients to the Medicine Hat Hospital at \$1.25 per day. Well water, only, was available. There were eight cases of typhoid, but no deaths reported.

Swift Current—Northwest.—Cabri to South Saskatchewan river, 40 miles, Dutton and Timson were the contractors, and the sub-contractors were Clark, Brown, Caughey Brothers, Saugren, and stationmen. In all 327 employees were engaged. Dr. K. C. Cairns, of Swift Current, using the Swift Current City Hospital, was assisted by Dr. J. Knippel, of Cabri, on the grade. Wells were in vogue, and sickness was conspicuously absent.

Regina—Moosejaw, and Moosejaw—Chaplin.—*Double-tracking.*—Dutton and Timson were the contractors. The sub-contractors were McPherson and Dutton, Gate City Co., Traynor, Molloy Brothers, Paget, McRae and Briscoe. They engaged 220 men. There was respectively 42 and 53 miles under construction. Dr. R. H. Smith, of Moosejaw, using the Moosejaw City Hospital, was assisted by Dr. Young, and there was no sickness to mention.

Kootenay Central.—Colvalli, north from the Crow's Nest line, and from Golden south from main line through the Kicking Horse Pass. The Canadian Pacific railroad were doing force work on the bridges, and culverts and ballasting, and the 60 men employed were in charge of Drs. King and Green, of Cranbrook, any cases of sickness being cared for in the Cranbrook Hospital. Burns and Jordan also employed 80 men, who were under the same medical service. This firm has lately taken the contract for the balance of the road between Golden and Colvalli, and hope to finish it this year. From Golden south, Janse, Boomer and Hughes were the contractors, with 60 men. Dr. Taylor, with a hospital in Golden, was giving a good service. There had been none but minor accidents, and no deaths.

Kettle Valley Line between Penticton and Merritt.—From mile 25 south of Merritt to Coquihalla Summit at mile 38, Twohey Brothers are the contractors, having six camps, employing 350 men. On the Penticton end for 18 miles Grant Smith is the contractor, having three camps and 150 men. Dr. Ker has the contract for the medical work, and employs Dr. Gillis of Merritt, and the Nicola Valley Hospital on the Merritt end, and Dr. Davis with a private hospital at the Penticton end. The camps are large and well built and the general health good, there being the very best of water and unpolluted mountain streams. There were a few minor accidents.

GREAT NORTHERN RAILWAY.

Coalmont to Canyon House.—From Princeton over Hope Mountain in Southern British Columbia, 20 miles is being built by Guthrie and McDougall, with (1) Wardenhoff and Jacobson and (2) J. G. McLean as sub-contractors. There are in all seven camps and 505 men in care of Dr. McCaffren, of Princeton, B.C. He has a hospital located in Princeton. There were three serious cases of non-epidemic sickness and no deaths.

CANADIAN NORTHERN RAILWAY.

McLeod-Crows Nest and McLeod North.—The contractors are the Northern Construction Company. The sub-contractors are (1) McDonald and (2) Jas. O'Connor, who had re-sublet to Whelan & Malong, Wilson, Erickson, Murphy, J. Whelan, and Duggan & Young. They had 133 men employed, with Dr. Kennedy of McLeod, Alta., in charge of patients in the hospital in McLeod town, and Dr. Reid on the grade. He was covering 35 miles and all was satisfactory on the work.

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Camrose—Strathcona.—The Northern Construction Company, the chief contractors sublet all of the 16 miles in this contract to Owens, Swan, Thompson & Davis, and about 75 stationmen. In all there were 240 employed. Drs. Stewart and Smith of Camrose looked after the camps, and when necessary sent cases to the Edmonton hospitals, as well as taking them to the Camrose Hospital. The work was finished early last summer, and without any untoward conditions arising.

Goose Lake Extension.—The Northern Construction Company were the chief contractors, and sublet the work to G. Bryson, A. C. Bryson, Sinclair, Miller and Turnbull, Anderson, Doyle, Wilson and numerous stationmen. 353 were engaged on the grade over a distance of 25 miles. Dr. Grant with a hospital on the grade furnished the medical service. On this work wells had to be relied on since this line is now extended well into the 'dry belt.' The camps moved frequently and generally health was good.

Gravelburg Extension.—W. J. Cowan, the contractor, sub-let to Keck Brothers, F. J. Peterson, Thompkins, Peterson & Nicholson, and Mathew Peterson. 200 men were engaged. Dr. Fraser with a tent hospital at F. J. Peterson's camp, looked after the 25 miles of grade. The service was only fair, but the employees were free of unusual sickness.

Vonda—Melfort.—C. H. Richards and nephew, had two camps and 81 men. Dr. W. Mackay was the medical officer, and sent any cases to be had to Saskatoon hospital, where Dr. Peterson looked after them.

Dalmeny—Laird Branch.—This 15 miles was being built by J. W. Miller, and two small subs with 50 men looked after by Dr. Hodgins who was also with a Canadian Northern railroad ballasting gang on the main line. The hospital in North Battleford was being utilized.

Prince Albert—Battleford.—Cowan & Co. were the contractors. Wilson & Woodward and Jas. McKenzie, and smaller subs employing 200 men were spread along 30 miles of right-of-way. Dr. Simpson was in charge and had arrangements with the hospital in North Battleford.

Peace River Branch.—Pembina River to McLeod-Athabaska Crossing. The contractors are the Northern Construction Company, whose sub-contractors are the Tobin Construction Co., John Bradley, Berry, Cooney & Farrel, Bishop & McLean, Bumble, Mann & Co., T. Hopgood, W. Hopgood, Allen Brothers, W. T. Mackenzie, Burke & Gorham. In all there were 449 employees, taken care of by Dr. Ross, with a tent hospital on the line. There were no complaints or deaths due to the work, and little sickness.

Edmonton—St. Paul de Metis.—The contractors are the Northern Construction Company, who sub-let to McCrimmon, who with subs had 98 men. Dr. Rippon of North Edmonton utilizing the Edmonton General Hospital, gave the men good attention.

Main Line between Pembina River and Yellowhead Pass in Alberta.—The chief contractors are: (1) Phelan & Shirley, who have as sub-contractors (a) Shepherd & Stevens, (b) W. T. Parsons, (c) A. S. Wright, (d) C. E. Sandine, (e) Wright, (f) stationmen (g) Lundberg & Co.

(2) W. T. Parsons on tunnel work.

(3) Jas. O'Connor.

(4) Canadian Northern railway force work on Athabaska bridge, Big Eddy and mile 149, also a steel laying gang. In all there were 1,055 men on this stretch of work, and the medical service consisted of: Dr. Wellwood of Entwistle, with a hospital at Entwistle. He had easy access to the 50 miles of nearly finished work in his district, from the Grand Trunk Pacific railway. The whole of this line from Pembina river to the Yellowhead Pass, parallels the Grand Trunk Pacific railway and is within a few minutes walk at any point, a condition which greatly assists the

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medical service. Next west was Dr. Sexton, at Hinton, with a small hospital for emergency cases. Then followed Dr. Myers, at Fitzhugh, with a base hospital and Dr. Jardine on the grade west of that place to the summit of the Pass. The hospital records showed nine cases of typhoid and no deaths. The accidents were not in numbers out of proportion to what is always occurring on a mixture of earth and rock work.

One complaint was received of an important contractor pitching on an old Grand Trunk Pacific camp ground, and a special visit was made to investigate. There was no other place for him to camp convenient to his work. He spent a good deal of money and made a thorough clean up, and was let remain. No bad results followed.

HUDSON BAY RAILWAY.

The Pas to Limestone Lake.—The chief contracting firm is McArthur & Boyd. Their sub-contractor is McMillan Brothers, who have under them Stewart & Jones, Luky, DeCreen, Ray, and some stationmen. All told there was 500 men engaged. Dr. M. R. Simpson, Winnipeg, is chief, and Dr. Orok, The Pas, is on the work. The hospital used is St. Anthony's at The Pas and occasionally Dr. Gillis of The Pas assists. There is an emergency hospital at mile 40. There was one typhoid and a few minor troubles, and no deaths and no complaints.

EDMONTON-DUNVEGAN RAILWAY.

J. D. McArthur is the contractor and principal. He sub-lets to D. F. McArthur, who subs a part of the work to Hansen & Co., Porteous & Co., who re-lets to six others, some of whom sub again. There are also stationmen, clearing gangs on right-of-way, and road crews. The total number was 346. Dr. Farquharson, Edmonton, is in charge, and had Dr. Williams on the grade, the two of them looking after 60 miles. The hospital employed was the Misericordia in Edmonton. There were two mild cases of smallpox and nothing else worthy of remark.

GRAND TRUNK PACIFIC RAILWAY.

Prince Albert—Wakaw.—This branch was nearly completed by the original contractors, Sutherland and Birchall, assisted by Clark & Co., each with one camp and 20 men. They were all working close to Prince Albert where a doctor could be called at any time and no medical service had been arranged, and no fees were being collected.

Biggar—Battleford.—J. Daudeland was completing this work with 60 men and had engaged Dr. Blyth with arrangements at Battleford hospital to take care of any cases of sickness.

Cutknife Branch from Battleford to Wainwright, on the main line.—C. C. Barnes was the contractor, with five subs: Leach, Curry, Barnes, Hill and Turnbull. 123 men were engaged in all, and Dr. Stanley Miller of Battleford, using the Battleford hospital, was giving good service. He covered 50 miles of scattered operations with a motor car.

Main Line from Prince Rupert to Burns Lake.—Chief contractors are Foley, Welsh and Stewart, who have sub-let to Wall and Swann (wooden bridges), Norman McLeod, mile 20 East of Hazelton, Frebert and Stone, Foley, Welsh & Stewart (Chicken Lake), Neuse and Williams, Bostrom, Hugh McLeod, Freberg and Stone, M. Shady, Albi, D. Ross, John McLeod, Paget, Stewart Brothers and Rankin at mile 142 East of Hazelton, stationmen about 140 from Aldermere west. There was also Foley, Welsh & Stewart's teamsters, roadbuilders, Barrett's cache, Hazelton cache and Arnott's pile driving gang. There were 1,426 employees. The chief medical officer is Dr. Ewing, who resides in Vancouver, and occasionally visits the work. His assist-

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ants resident on the contract are: Dr. Kearney at mile 23 east of Hazelton, with a hospital of 6 beds. He was covering 50 miles of scattered work, nearly completed, with a saddle horse. Dr. Sproule takes charge from mile 56 to 102, with a hospital of eight beds at mile 74. He had a team of horses and covered 46 miles. Next east on the line was Dr. Webb from mile 114 to 154 with a hospital of 24 beds, covering 40 miles with a saddle horse. There is a telephone throughout the whole line and calls are always responded to promptly. The hospitals on this work are better equipped this year than last, but have not been kept as clean and tidy as they should be all the time. The chief surgeon is supposed again this year to return to the line and give it his personal supervision.

There are two other direct contracts from the Grand Trunk Pacific, one is A. McDougall with 100 men extending the yard room in Prince Rupert, and the other Bates and Rogers with two camps and 190 men lining tunnels along the Skeena river. Dr. Trewayne of Prince Rupert is in charge of both, and takes his cases to the Prince Rupert hospital.

On the whole west end, there are 1,716 employees. Only four cases of contagious diseases of serious character were reported and four sudden deaths from explosions. There was at all times the usual percentage of ordinary ailments and many minor accidents.

Brandon—Hart Branch.—Hyland, Plummer & Galloway have sub-let to Wm. Bradley, who only engaged about twenty men on the eight miles nearest Brandon. No service had been arranged or fees collected.

Mountain Park and Alberta Coal Branch.—This work is nearly completed by Phelan and Shirley, who still employ 170 men. Bates and Rogers are lining a large tunnel with 120 men. Dr. Shilabeer, with a hospital at mile 37, is still in charge. There are phones throughout the line, and the service has been good. There were two cases of erysipelas, four typhoids, and four sudden deaths from explosion.

Tete Janne Cache to Ft. George.—The main line of Grand Trunk Pacific west of Yellowhead Pass. Foley, Welsh & Stewart are the chief contractors. The work is sub-let to H. E. Carlton & Co., who have 11 camps. A. E. Griffin & Co., who sub-let to Winston, Byrne and Duffy, Morton Emmons, O'Reilly & Co., and Corrigan & Griffin, Burns, Jordan & Co., with eight camps of their own and sub-contractors, Emmerson Brothers, Gorman & Poole, Chien and Welsh, Presby and O'Brien, M. J. Burns & Co., and McDonald & McCarty. The remaining smaller contractors are M. F. Carey, Lund & Rogers, D. J. Carey & Co., McGriffin, Bergh & Co. The total number of men employed is 3,915. The camps were all built for winter quarters, and have been occupied by nearly full gangs. About half of them were floored. In all of them there was a number of men sleeping two in a bunk to economize in bedding. This is not good practice on railway work, but the men ask for the wider bunks. At time of last visit in November, approximately four-fifths of the men were between Tete Janne at mile 53 B.C. and mile 130 B.C. Dr. Richardson is chief surgeon and in charge of the other resident physicians on the contract. Stationed further west is Dr. Falconbridge, at Fort George, with a hospital at that point. He looks after a right of way cutting gang and the few scattered along the grade just commencing operations in that section. The next hospital to the east of this is at Willow river, with Dr. Nasmith in attendance. There were 35 beds and no patients. The work was new, and the hospital was in anticipation of the contractors who were soon to move farther west. Next going east was Dr. Grey, at mile 160, with a 15 bed hospital and no patients. The next in order was Dr. Richardson's headquarters and base hospital at mile 114, with 85 beds. Dr. G. H. Smith was assisting. There was surgical and medical wards and an operating room and contagious ward. There were nearly 50 cases in the wards. There was eight cases of infectious and con-

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tagious disease, and three deaths from sickness. No fatal accidents had occurred from explosions, though there were many minor injuries from various causes. The next and last hospital was at Tete-Janne Cache, mile 53, with Dr. Baker in charge. There were 22 beds and eight cases in the hospital, one of which was typhoid. There are trained nurses at all the hospitals, and telephones as far as mile 166. This is one of the best medical services in Western Canada.

SOUTHERN ALBERTA LAND COMPANY IRRIGATION DITCH.

Chief contractor of this work is D. F. MacArthur, to the westward. His subs are: Thacker, McMillan, Fogarty, Devereaux, Cairns, Wynham, Malin, Olsen & Nelson, Cameron, Fitzpatrick, Holden & Christensen. To the eastward the Southern Alberta Land Company had a large flume camp, and as sub-contractors on the ditch: Crandell Brothers, Ham, Swanson & Anderson, and Corsan. There were 439 employees. The medical service consisted to the west of Dr. Harris, of Taber, with a hospital at Taber, and Dr. Steele, of Suffield, using the hospital at Medicine Hat to the east. There were six cases of typhoid in one small camp which was moved to make an effectual clean up, and two cases in another. One death resulted. South of Gleichen the Southern Alberta Land Company had two camps. D. MacArthur, R. D. McGregor, G. H. Sissons, making a total of 522 men, with Dr. Farquharson of Gleichen in charge. The hospital used was the Holy Cross hospital of Calgary, where Dr. McGuffin was engaged to look after those sent in. There were nine cases of typhoid and two deaths during the summer.

CENTRAL ALBERTA RAILWAY.

Red Deer to Rocky Mountain House.—The contractor is D. F. MacArthur, who had three camps, 30 stationmen and a ditch camp, making a total of 245 men. Dr. Parsons of Red Deer, assisted by Dr. Mackenzie on the grade and utilizing the Red Deer hospital, were giving a good service.

Biggar—Calgary.—Twenty-five miles from Biggar, Sask., toward the southwest. Phalen & Shirley are the chief contractors, and their subs are D. Fitzgerald, Biggs and Clement, Mahoney, A. J. Rothwell, J. Fitzgerald & Jameson. 130 men were engaged and in charge of Dr. Chandler of Harwell, with a hospital at Harwell. There was no sickness.

MOOSEJAW—REGINA.

Marsh, Siems.—Carey, Smith & Co., and Rigby, Hyland and Plummer, with a camp each and 165 men in all were completing the last four miles of this work. Dr. Bawden, using the Moosejaw city hospital was in charge. Conditions were good.

CANADIAN PACIFIC IRRIGATION COMPANY.

This is east of Calgary, along the main line of the Canadian Pacific Railway. Janse, McDonald, are the chief contractors. The sub-contractors are: Ambursen, Hydraulic Construction Co., Grant Smith & Co., J. L. McKenney & Co., Jamieson and Kittiwell, Janse Brothers, Boomer and Hughes, Clifford & Co., McCorkendale Brothers, Janse Brothers, McNamara & Worth, McLaughlin, Kimball Brothers, Jackson, McKinney, and subs: Tobin, Noehren and Mannix and subs, Thursfield, Dukelaw & Sons, Brandenburg, Marshall, Pearson, Calwait, Kimble Brothers and subs, and other smaller contractors. There were 1,550 employees. Drs. Ker and Haszard were the contractors of the medical service. Dr. Haszard visited the round of camps by motor weekly and took care of the cases sent to the hospital in Calgary. Drs. Harris and Scott took charge of the camps in the district about Bassano. Dr. Anderson was in charge of the district around Brooks and of the hospital in Brooks. The

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exact mileage covered by each cannot be given and varied greatly on account of the main ditch having so many tributaries with camps on them that frequently changed their location. There were 57 cases of typhoid, of which a detailed statement is as follows:—

REPORT of Typhoid Fever occurring in construction camp of C.P.I.D. from April, 1912, to September 5, 1912.

Name of Contractor.	Location of Camp.	No. of typhoid patients.	Water Supply.	Condition of Camp.
J. L. McKinney & Co...	Team camp on Flat Bassano Dam.	8	Well and gravel pit	Good
"	Main camp, Bassano Dam.	19	River water.	Bad.
Ambursen Con. Co	Main camp	2	"	Good.
Grant Smith	Bassano Dam Flat	13	Gravel pit until 3 weeks ago...	"
"	Flume camp at Brooks.	5	Well water.....	"
McNamara & Worth....	10 miles north of Bassano....	1 teamster.	"	"
John Timothy.....	17 miles N.E. of Bassano....	1	"	"
Knibball Brothers..	3 miles N. of Bassano	1	"	"
Tobin.....	3 miles S. of Bassano, Crawling Valley	1	River water.	"
Janse Brothers.....	6 miles south of Southesk....	3	Open shallow well.	Fair.
Noehren & Mannix..	12 miles south of Brooks..	1	Well water.....	Good
S. Thursfield.....	.....	1	"	"
Dukelow & Sons.....	2 miles S.E. of Cassils..	1	"	"
		57		

All of these cases were taken care of at the hospital at Brooks, where there is a staff of three graduate nurses, and Dr. C. E. Anderson on duty.

In two or three instances, I found a disposition on the part of the contractors to collect fees for a while after work commenced, before they had made arrangements for medical service.

A. E. CLENDENAN,
Public Works Health Inspector.

The Honourable, Minister of Agriculture,
Ottawa.

MISCELLANEOUS

APPENDIX No. 18.

EXHIBITIONS.

GHENT, March 31, 1913.

SIR,—I beg to submit the following report regarding the operations of the Canadian Government Exhibition Commission during the twelve months extending from 31st March, 1912, to the 31st March, 1913.

CRYSTAL PALACE EXHIBITION.

The Government having decided to extend for another year the exhibition which they had put up in the Pavilion especially constructed for the Festival of Empire of 1911 on the grounds of the Crystal Palace it became necessary to make repairs to the exterior of the building and also changes and improvements in the interior, with a view to create fresh and renewed interest in the Canadian exhibit. To achieve this end the painting of the exterior, which had greatly suffered from rains and frost during the winter season, was entirely renewed; the decoration scheme of the interior was also changed and improved; a re-arrangement of all the exhibits was made; fresh fruits were installed in the horticultural section, and all exhibits which were deficient in quality or appearance were replaced by new ones.

The Pavilion was opened to the public from the 1st of May to the 24th of November, 1912, and although the number of people visiting the grounds did not come up to the 1911 mark, they were the kind we wanted, all being interested regarding Canada.

IDEAL HOME EXHIBITION.

In April, 1912, we placed a strong fruit exhibit in the Ideal Home Exhibition held in the Olympia, and promoted by the *Daily Mail*. This exhibit was favourably commented on in the daily press.

THE ROYAL AGRICULTURAL SHOW.

From the 22nd to the 30th of May, 1912, a great horticultural exhibition was held at Chelsea, London, in which the British Isles, France, Germany, Holland, Belgium, &c., took part. Canada was invited to participate, and, according to your instructions, I organized a Canadian horticultural section on these grounds. Canada showed in marquee 40 x 40 feet, which contained fresh apples in baskets among shrubs and plants grown from Canadian seeds, as well as a large variety of preserved fruit in their natural state on branch, and otherwise. Our exhibit was visited by their Majesties the King and Queen, Earl Grey, Lord and Lady Minto, and several other distinguished people. His Majesty commented favourably on our fruit exhibit, especially the bottled fruit.

I believe the decision of Canada to participate at the Royal International Horticultural Show was a very judicious one, as from all reports this exhibition was the finest of its kind held in Europe for the last twenty years. It attracted a very large

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number of visitors from all over the British Isles and the Continent of Europe, who had thus the opportunity of acquainting themselves with the great horticultural resources of Canada.

THE PANAMA PACIFIC EXPOSITION.

Immediately after the closing of the Royal Agricultural Show, I left for San Francisco, California, in order to select the site to be occupied by the Canadian Section at the Panama Pacific Exposition of 1915, and was very well received by the members of the Executive Committee of the Exposition who placed at the disposal of Canada, free of charge, a large piece of land in one of the best parts of the grounds and covering an area of 250 x 500 feet. This site is close to the sites selected by the Western States, and in making this selection I thought it would be of great advantage owing to the large number of people who have gone to Canada from these States. Many of these people along with others will, as at Seattle, be much interested in the Canadian exhibit.

IMPERIAL INSTITUTE.

On my return to London at the end of July, I resumed my duties at our exhibit in the Crystal Palace grounds. I availed myself of the opportunity of the exhibition staff being in London to have some repairs and improvements carried out in the Canadian section of the Imperial Institute, for which a sum of money had been placed in the estimates. In the course of August, September and October, some members of my staff were engaged in putting our exhibit at the Institute in a better condition. The agricultural and horticultural show-cases and the decorations of the section were rearranged or renewed; fifty decorative panels and numerous designs of various dimensions, and all executed in Canadian grain and grasses, were added to the ornamentation of the section; a large case was also erected for bottled fruit. This display, for quality, is admitted by all to be the best that has been placed before the public of London. Besides this, a section of the court was finished to receive a large map of Canada, the map being placed behind glass, the whole being in keeping with the general exhibit.

From the reports of the authorities of the Imperial Institute, the Canadian section is very largely attended and proves to be very popular.

GENERAL WORK.

I may also mention here that during the year 1912 we received from many concerns in London who are intimately connected with Canadian national life and who had the opportunity to appreciate the work achieved by the Canadian staff of decorators in the pavilion at the Crystal Palace, requests to help them in decorating and dressing up their show-windows with the specimens of Canadian products which they wanted to place before the public eye. We thus contributed to the decoration of the show-windows of the Ontario Government offices, on the Strand; the Quebec Government Offices, Kingsway; the Canadian Pacific Railway, Trafalgar Square; the Grand Trunk Railway, Cockspur Street, and the Canadian Northern Railway, in the city. All these companies contributed to the cost of the work done. Besides these, we also did the Canadian Government Emigration Offices, Charing Cross, and the front window of Messrs. Thomas Cook & Sons' general offices.

THE CHILDREN'S WELFARE EXHIBITION.

From December 31, 1912, to January 10, 1913, an exhibition called the Children's Welfare Exhibition, organized by the *London Daily News and Leader*, was held at the Olympia, London, and, according to the instructions received from your depart-

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ment, I advised the committee that Canada would participate therein. We secured on the main floor a central position measuring about 3,000 feet, which formed a hollow square surrounded on three sides by show-cases containing many varieties of fresh apples, bottled fruit in preservation, cereals, tinned vegetables, &c., and showing in rear of the cases transparent photographs of agricultural scenes. The interior of this square contained a large panorama illustrating the route of the railway from Port Arthur to British Columbia; a miniature railway traversed the whole route with about 250 feet of tracks, the freight trains stopping at elevators for loading wheat, &c. Our exhibit obtained a great success; as a matter of fact, it was the great drawing card of this exhibition.

THE GHENT EXHIBITION.

In September I crossed to Belgium to secure the site intended for the Canadian Pavilion at the Ghent Universal and International Exhibition, in which the Canadian Government has decided to participate on a large scale. An area of land measuring about 50,000 square feet was offered to us free of charge, and I accepted it at once, as its location seemed very favourable to me.

In Ghent I found the people, who are principally Flemish, very ambitious that their exhibition should be more effective than the one held in Brussels in 1910, and in some respects I think they will succeed in doing so. The Commissioner General for the government and the president of the executive committee of the exhibition are both Flemish and expressed their anxiety to have Canada make a still better display than at Brussels, admitting at the same time that our section at Brussels was better than at Liege; furthermore, they wanted the greater portion of the reading matter explaining the different exhibits to be written in Flemish. To do this it meant that the reading matter had to be in four languages: French, Flemish, English and German.

At other expositions on the Continent where Canada participated, we have had a few Germans employed on construction work, but on our building here this number has increased to 25 per cent of the number of men employed. German carpenters are good mechanics and good workers, and very much interested in Canada. The German exhibit is close to our pavilion, so that we expect to get quite a good proportion of German literature disposed of amongst these people; in fact our pavilion is well placed to reach the natives of countries in which Canada cannot carry on an emigration propaganda, and feeling that this was our great object in making this exhibit, and considering the wish expressed by the authorities of the exposition, as mentioned above, and also that it was in the interest of Canada to do so, especially when she will have no other opportunity to exhibit under similar circumstances on the Continent of Europe for many years, I thought it well to do something out of the ordinary, and I may say that both the building itself and the interior decoration and arrangements are by far the best we ever had on this Continent.

The construction work was commenced early in November by the large firm of Humphreys, Ltd., of London, who hold themselves entirely responsible for the work in consideration of a commission of fifteen per cent on the cost of the building, this including salary and expenses of the architect and clerk of works, who have been on the grounds for five months. All the interior decorations are made in Canadian grasses and straws and include a series of tableaux representing a large variety of Canadian landscapes, agricultural and horticultural scenes, &c.—the whole of which produces a most impressive and realistic effect. Our exhibit consists of the products of agriculture, horticulture, mines, forestry, fisheries, fauna, agricultural machinery, railroad transportation, &c. All our exhibits are in splendid condition and form a comprehensive collection of the productions of Canada, and I feel certain that their

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intrinsic value coupled with the manner in which they are placed before the public will attract a great deal of attention and ensure the success of our participation at this great World's Fair.

The whole respectfully submitted.

WM. HUTCHISON,
Canadian Exhibition Commissioner.

To the Honourable Minister of Agriculture,
Ottawa.

APPENDIX No. 19.

THE SEVENTH INTERNATIONAL CONGRESS AGAINST TUBERCULOSIS,
ROME, ITALY.

SIR,—Acting upon your commission of March, 1912, as one of the delegates to the Seventh International Congress on Tuberculosis held in Rome, April 14 to 21, I beg leave to report upon matters which were submitted to the members of the Congress, and in addition wish to submit material collected throughout Europe during the six months which preceded it.

THE CONGRESS.

It was well attended, in spite of its having been deferred from the autumn of 1911. With few exceptions, the various countries of the world were represented by one or more delegates. The Italian profession flocked to Rome from every corner of the Kingdom, while many of the Italian savants spared no efforts to bring enlightenment to their own countrymen, giving the foreign delegates every opportunity to benefit by the fruit of their labours.

One naturally asks what was the chief feature of interest brought out at such a gathering?

There were many interesting communications. In chemio-therapy and helio-therapy much promising material was submitted both at the congress and the conference. The social aspect of the question was well presented by numerous representatives, showing that all civilized countries were quite thoroughly organized in that department. Compulsory notification was pretty fully discussed, winning over a goodly majority of the delegates to the need of the adoption of such a measure in order to make the crusade truly effective.

The influence of alcohol as a factor in the dissemination of tuberculosis was strongly emphasized by a large number of medical authorities.

As at former congresses, the burning question was that of bovine and human tuberculosis, their difference and relationships being fully discussed. In the scope of this report one could not attempt to bring out any part of the discussion. The conclusions adopted finally were but the result of compromise on both sides, and these resolutions were only framed up sentences telling what we have long known, viz., that: The greatest source of danger to man is man himself—not the much maligned bovine.

THE CHILD AND TUBERCULOSIS.

Under this heading much valuable material offered. The most convincing work was that presented by Calmette, of Lille. In fact it is so important that a brief analysis of it is bound to arouse interest. His contention that infection in tuberculosis occurs during childhood is borne out by facts observed by others as well as himself.

Last year between January and June he submitted 1,226 children to the cuti-reaction (Tuberculine). These children were not attending hospitals or dispensaries—they were looked upon as healthy.

The following table gives a good idea of the results:—

Age.	Number tested.	Infected.
		%
0 to 1 yr.....	273	9
1 to 2 yrs.....	145	22
2 to 5 yrs.....	206	54
5 to 15 yrs.....	366	81
Over 15 yrs.....	236	88

Concording with these findings but obtained from an entirely different source are those of Harbitz, of Christiana. In this instance he reports upon autopsies made upon children whose death had been caused by various diseases, to the number of 484, with the following results:—

First year of life..	20%	} were found to be infected with tuberculosis.
Second year of life ..	27%	
Fourth and fifth year ..	44%	
Sixth to fourteenth year..	75%	
Fifteenth year ..	85%	

Calmette claims that at the age of 20 very few human beings have escaped infection by the tubercle bacillus.

What can all this mean?

For a reply we again have to refer to Calmette's experimental work performed upon calves at the Pasteur Institute at Lille. During the course of these experiments he followed as closely as possible the methods which nature uses to infect man. Here he found that his animals readily recovered from a first, a second, a third and in fact many infections, if only the animals were given sufficient time in which to recover. In fact, each infection produced a certain degree of immunity if the lapse of time allowed for recovery was sufficiently long—it always took larger quantities to re-infect. From this work Calmette concludes that among human beings tuberculous disease develops when the doses of infecting material are very large or repeatedly absorbed at short intervals.

In any event, one sees in the mechanism of this childhood infection the role played by nature to protect or vaccinate—truly this should point out to us what ought to be the direction of our efforts to assist nature in her protective work.

Following up this idea of childhood infection, Webb, of Colorado, and Maragliano, of Italy, reported at the Congress attempts to vaccinate children, expressing the hope at the same time that it might yet become possible to do this with a determinate dose of living bacilli injected into the subcutaneous tissues.

Webb's experimental work was done with monkeys; the account of it appearing in the transactions of the Congress will prove interesting reading.

CURATIVE MEASURES.

Here of course endless modifications of older methods were advocated—entirely new methods were also submitted for appreciation. Among the new methods may be mentioned the attempt at curing tuberculous disease by injecting directly into the

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blood-stream different chemical reagents. Among the most notable was that advocated by Finckler, of Bonn, consisting of aniline colours with iodine and a copper salt. The results thus far have not been very convincing, but this mode of treatment is being persistently applied by the German school and much is hoped for eventually. Open air methods with generous feeding still remain dominant as the curative factor giving the most uniformly good results. Right here I may be allowed to mention and perhaps *outline* a method of treatment developed in England depending upon fresh air and generous feeding, but systematized.

I was sorry to find that no report upon this method was made at the Congress. To my mind it is one advance made of late years in the hygieno-dietetic treatment. I wish to refer to the Frimley method. The Frimley Sanatorium is the suburban annex of the Brompton Hospital for Consumptives in London. About eight years ago, Dr. Marcus Paterson became superintendent at Frimley and there worked out this method of graduated exercise and labour with periods of absolute rest—splinted rest, so to speak. His report upon results obtained published in the fall of 1911 was decidedly encouraging.

Among the advantages of this method are the following:—

(1) It gives every individual affected with tuberculosis some chance of recovery. many individuals who seemed hopelessly ill have recovered completely at Frimley.

(2) The Hospitable for Incurables becomes unnecessary since patients in every stage of the disease are admitted with some expectation of recovery.

(3) No special climate or altitude is needed, fresh air, generous feeding and supervised exercise with gradually increased labour form the basis of the treatment.

(4) The duration of the treatment is shortened by nearly one-half.

(5) Tendency to relapse is reduced to a minimum.

(6) Employment during the treatment avoids making units of recovered patients such as the reclining chair frequently does.

The basic principle upon which the Frimley method is founded is resistance. In tuberculosis this factor resistance has been quite generally understood of late years. 'Increase the physical resistance of your patient and he straight away gets well' is a phrase now in common use by phthisiologists.

I have said that the Frimley method is systematized—in reality it is a system which meets most of the needs of the tuberculosis problem. Founded as it is upon a principle which is rapidly being accepted wherever known it reduces the treatment to a simple formula: Restore the broken down resistance of the patient, whether he be in the first, second or third stage of the disease matters not, he has some chance of recovery even in the third stage, that is what makes the Frimley method worth while; there is no need of a hospital for incurables.

The hospital for incurables is what actually discourages the patient most of all, but think of the philanthropist whose help is sought to build and equip a refuge for the incurables from a disease which is known to be curable. There remains nothing to explain; it is clear that the position we have taken in the past is not right.

Now think of the infection as occurring in childhood and the disease developing in adolescence or later, then the mechanism of resistance appears in a new, a different light. Broken down resistance is really the great factor in the development of tuberculous disease after all. Everybody knows the conditions which bring this about, it is a large sociological problem which is being faced by all civilized countries. We may yet come to the conclusion that infection in the adult is quite secondary as a producer of tuberculous disease. Infection in the child may yet be accepted as nature's method of protecting life. We should read these sign boards more attentively.

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In Canada how may we benefit from these congresses and the movement in the world at large? In the first place the budget placed at the disposal of the Canadian Association for the Prevention of Tuberculosis must be sufficient to enable some of its officers or others to keep in very close touch abroad and distribute the information obtained in the shortest possible time at home.

Through this agency field work should be carried on to a final issue in the various provinces and particularly in the large cities. By this I do not mean efforts limited to an occasional campaign alone but the assistance should go far enough so that the organizations in each area should be taught how to raise the necessary funds, how to build, equip and manage the institution brought into existence. The minutiae should be gone into as though one were pursuing the policy of the federal government in its various agricultural departments.

Again, the question of research work in this country is of the greatest importance and should receive assistance. The central association should have funds at the disposal to distribute where such work is done in existing institutions.

Respectfully submitted,

A. J. RICHER.

To the Honourable Minister of Agriculture,
Ottawa.

